Industrial Medicine

for

Physicians and Surgeons in Industry

The Pneumonokonioses (Silicosis)

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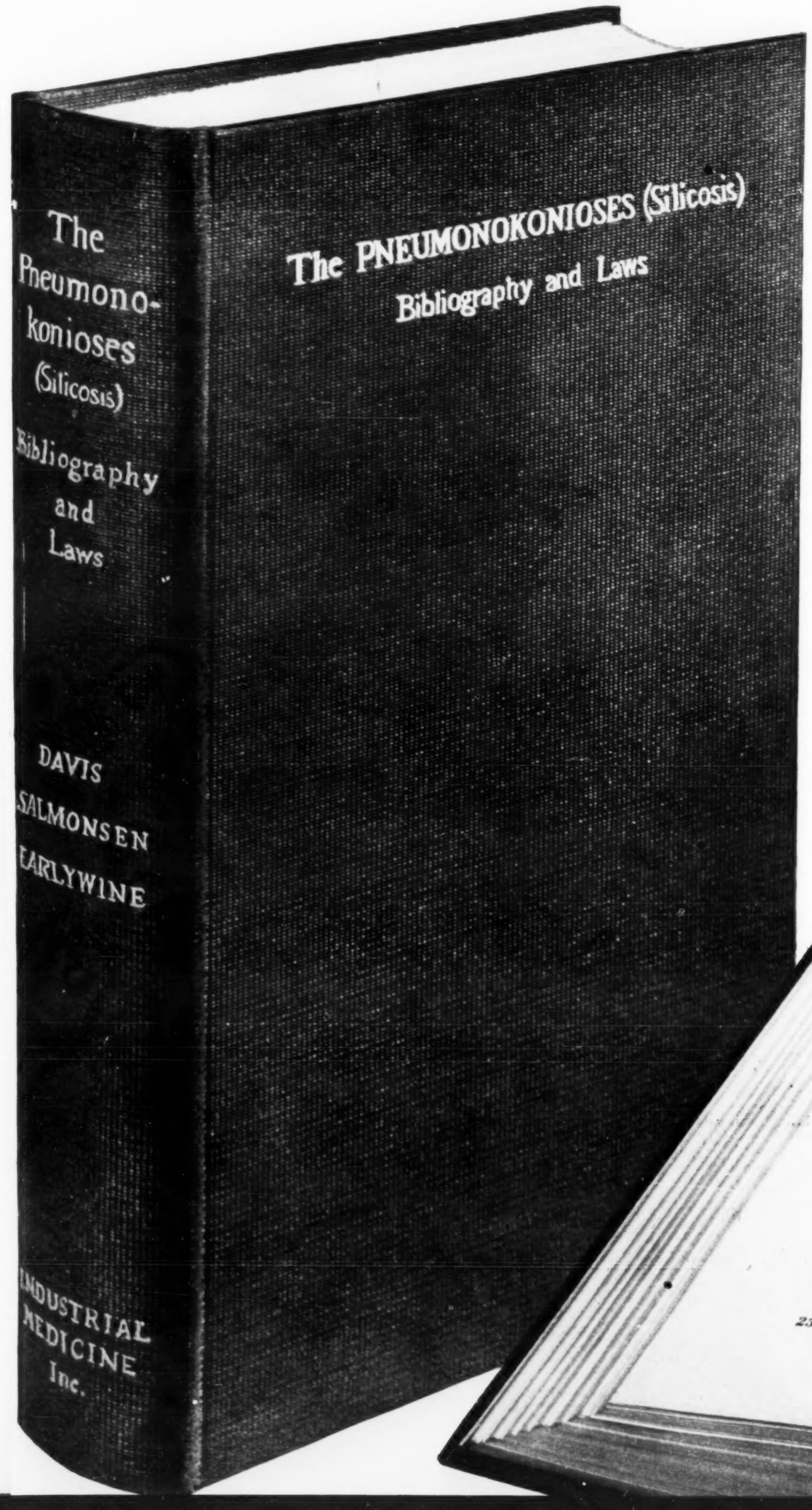

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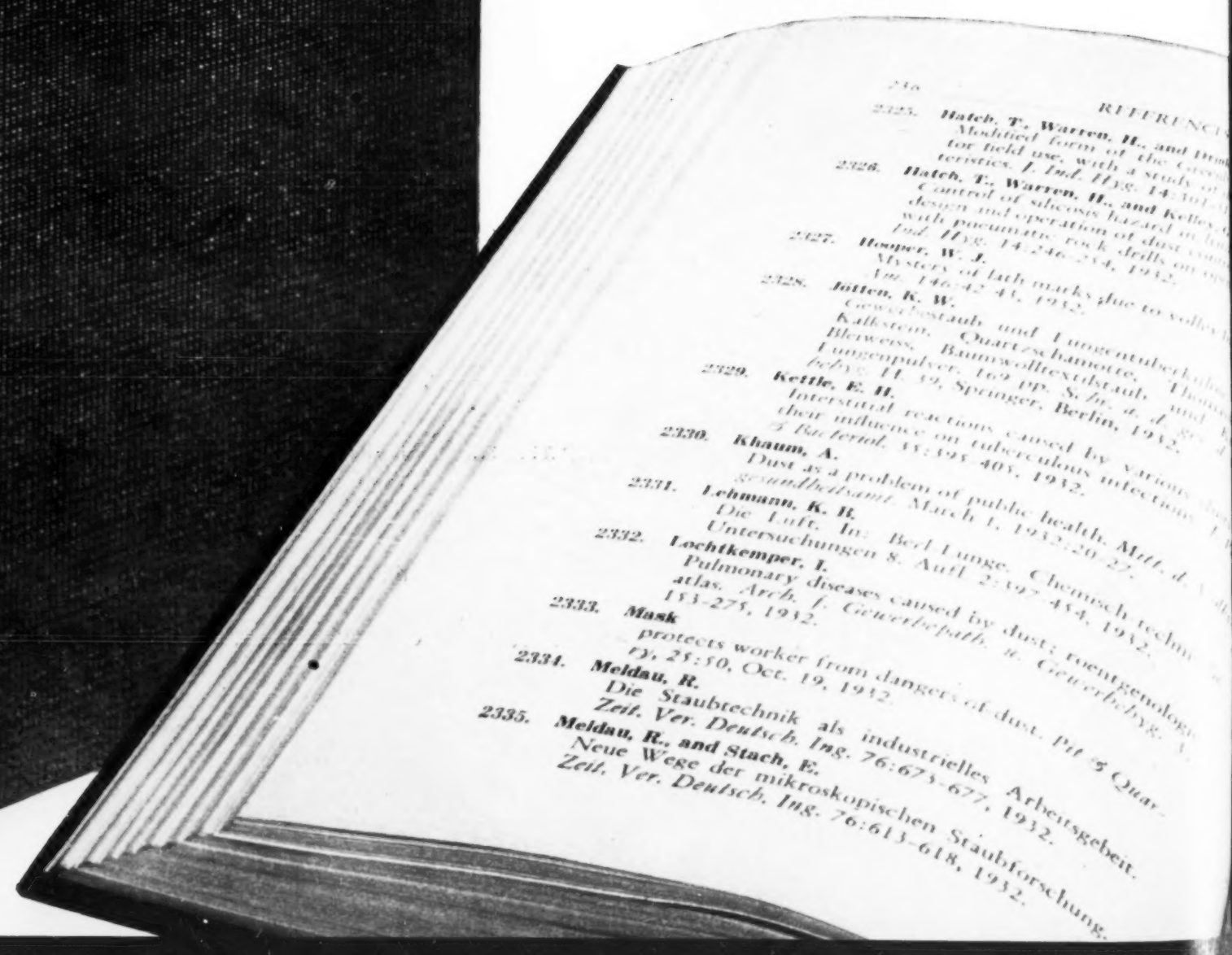

This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

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Cardiac Pathology

What Is Its Relation To Industry?

by

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TO THE MAN who practices industrial medicine, two questions arise with great frequency: what was the physical condition of the claimant before his injury, and what role, if any, did the injury play in his present condition?

To be able to answer these two questions correctly in every instance would indeed be ideal, but too often we are confronted with very difficult problems. The surgeon, in the majority of instances, has a fairly clear-cut relationship between the injury and resulting pathology — particularly the orthopedic surgeon. Often, however, the internist after honest and diligent study can only say, "Here are the facts, and what is now present could have been related to the injury."

The patient who *has* something is usually less of a problem than the patient who *thinks* he has something. Subjective symptoms are more frequent and persistent in medical cases than they are in surgical. Often we cannot disprove a logical basis for symptoms as the orthopedist can with motions and measurements or the surgeon by exploration. In a surprisingly large number of cases the only true answer to the relationship between pathology and industry is given to us by the autopsy surgeon. It is my own feeling, however, that the Industrial Accident Commission in case of doubt usually gives the benefit to the injured. Compensation has to be paid or not paid. One cannot wait until death to prove the relationship, or compensation would be like life insurance, where one has to die to collect. Of course the answer to all this is more thorough initial examinations and thorough periodic examinations of the employee. A review of Commission hearings regarding cardiac disability or death shows very conflicting testimony by the medical witnesses. Some of the files have grown thick with this voluminous and very often acrimonious discussion. Having taken part in some of them, it is with pleasure that I discuss certain accepted facts and present my personal opinions upon this subject.

Some of us may not have a clear understanding of the exact terminology and meaning of the term "injury" as used in the Workmen's Compensation Insurance safety laws of California.

The definition is very brief, and I quote verbatim:

"The term 'injury' as used in this Act shall include any injury or disease arising out of the employment. . . . In case of aggravation of any disease existing prior to such injury, compensation shall be allowed only for such proportion of the disability due to the aggravation of such prior disease as may be reasonably attributed to the injury.

"Liability for the compensation provided by this Act . . . shall . . . exist against an employer for any injury sustained by his employees arising out of and in the course of the employment and for the death of any such employee, if the injury shall proximately cause the death . . . (2) where, at the time of the injury, the employee is performing service growing out of and incidental to his employment and is acting within the course of his employment . . . (3) where the injury is proximately caused by the employment, either with or without negligence . . .

"The fact that an employee has suffered a previous disability . . . shall not preclude him from compensation for a later injury, or his dependents from compensation for death resulting therefrom . . . "[1]

It is clear then that the benefits of the Workman's Compensation law are not limited to those in perfect health. Also, the acceleration or aggravation of a pre-existing disease is an injury in the occupation causing such acceleration. Also, notwithstanding the previously diseased condition of an employee and in the natural consequence of which his inevitable death will ensue, if it is satisfactorily established that his death, although primarily caused by his idiopathic condition, was in any way superinduced by his employment, the liability of the employer is fixed.[2,3,4,5]

The two important questions, then, in injury or disease affecting the heart are these: *first*, is it possible to determine the presence of pre-existing

* Read before the Industrial Section of the San Francisco County Medical Society, January 21, 1936.

pathology in the heart and, *second*, if the heart was normal, did the injury cause its present pathology, and if the heart was not normal did the injury exacerbate the cardiac condition?

In the proper consideration of this question, six distinct divisions of thought appear: *first*, pathology exogenous to the heart which may interfere with cardiac function; *second*, the pericardium; *third*, the heart itself, including valves and muscle; *fourth*, the aorta, (ascending portion and arch); *fifth*, the coronary vessels; and *sixth*, the blood.

1. Pathology Exogenous To The Heart Which May Interfere With Cardiac Function:
   - A—Injury:
     - Pneumothorax;
     - Rib Fracture;
     - Sternum fracture;
     - Trauma;
     - Embolic phenomena;
     - Vascular injury;
     - Shock;
     - Hemorrhage.
   - B—Disease:
     - Septicemias;
     - Toxemias;
     - Congenital defects;
     - Anoxemias.
2. The Pericardium:
   - A—Acute States:
     - Trauma;
     - Pressure;
     - Puncture;
     - Fluid;
     - Inflammation.
   - B—Subacute or Chronic:
     - Traumatic effects;
     - Bacterial metastases;
     - Septicemia, general;
     - Inflammatory process extension;
     - Adhesions.
3. The Heart:
   - A—Pre-existing Pathology:
     - Endocarditis;
     - Congenital defects;
     - Hypertrophy;
     - Dilatation;
     - Myocarditis;
     - Arhythmias.
   - B—Pathology Possibly Related to Industry:
     - Exacerbation of above;
     - Wounds;
     - Infarction;
     - Septicemias, i. e., streptococcus and pneumococcus.
4. The Aorta (Ascending Portion And Arch):
   - A—Pre-existing Pathology:
     - Aortitis;
     - Congenital defects;
     - Dilatation;
     - Aneurysm.
   - B—Pathology Related to Industry:
     - Exacerbation of one of above;
     - Effort phenomena;
     - Trauma phenomena.
5. The Coronary Vessels:
   - A—Pre-existing Pathology:
     - Congenital abnormalities;
     - Sclerosis and vessel changes from disease and toxemia;
     - Occlusion in various stages.
   - B—Pathology Which May Be Related to Industry:
     - Exacerbation of above;
     - Effort phenomena;
     - Thrombosis;
     - Vessel spasm and ischemia;
     - Complete occlusion.
6. The Blood:
   - Leukemia;
   - Thrombocytosis;
   - Severe anemias;
   - Anoxemia—copoisoning: high altitude;
   - Methemoglobinemia;
   - Asphyxia;
   - Increased blood viscosity;
   - Polycythemia;
   - Diarrheas;
   - Intestinal obstruction;
   - Burns, etc.

NOW, in consideration of the first subject—pathology exogenous to the heart which may interfere with cardiac function—we must first consider injury. Pneumothorax is not infrequent as the result of falls and blows. It often increases the work of the heart by increasing its rate to keep up the oxygen needs of the body through the respiration in one lung only. It also may embarrass the heart by changing its position. Fractures in various areas of the thoracic cage in the ribs, sternum or spine can embarrass the cardiac action by actual damage to the heart, which we will discuss later, or by merely changing its position. Empyema may follow in the wake of some of these conditions, resulting in more work for the heart. Then there are the embolic phenomena, with emboli of varying kinds, occurring not infrequently in showers or singly in very moderate injuries. Vascular injury away from the heart, in itself or from accompanying shock and hemorrhage, may seriously impair the heart's ability to function. The shock resulting from hemorrhage from internal injury or necessary surgery may find the heart unequal to meet the demands placed upon it.

From exogenous *injury* we pass now to the discussion of other pathology away from the heart, but which may affect it. First, under the heading of *disease* exogenous to the heart we have pyogenic and septicemic conditions, such as nephritis of an acute character from various causes such as burns and infections. We have wound infections, tonsillectomies and teeth extractions not infrequently resulting in septicemia. All of us have seen streptococcic or staphyloccic septicemias result from expected and unexpected sources. A previously diseased endocardium or rather a previously diseased valve with vegetations is most frequently the fertile ground upon which these organisms may linger. Many serious and fatal cases of endocarditis result from such septicemias, industrial in etiology.

Other conditions included in disease exogenous to the heart are the toxemias, such as chemical poisoning of various kinds, acidosis, diabetic, hepatic, and uremic states. Most common and important among these is hyperthyoidism. An individual with a goiter of severity or long standing certainly has not a normal heart. Aside from this pre-existing myocardial damage, an injury

and shock may exacerbate the hyperthyroidism and have been so accepted by insurance carriers. Circulatory hypertension, if accompanied by cardiac hypertrophy or other damage, may be the deciding factor in the prognosis of an individual affected by an injury or disease.

Fibrosis of the lungs, such as we find in silicosis and tuberculosis, may through a period of time affect the heart, principally the right side, in hypertrophy and myocardial damage.

Vascular disease, whether arterial, venous or capillary, may take its toll from the heart. Leading cardiac students of the world realize the frequency and disability resulting from neurocirculatory asthenia, whether from work, strain or disease. Congenital defects near the heart, such as the aorta, may seriously affect normal cardiac function. Acute cor pulmonale has resulted from pulmonary embolism.[6] So much for conditions exogenous to the heart, pre-existing or not but having or likely to cause cardiac disability or failure, either in the injury itself or the condition arising from it.

IN OUR consideration of the pericardial sac, we may divide conditions into acute and chronic, or primary and secondary. Of the acute conditions we may have trauma resulting in tear or rupture.[7] We have the pressure phenomena such as pneumopericardium and effusive pericarditis. The latter may be inflammatory or pyogenic in character. The above pathology may result in recovery but more likely in prolonged disability or death. In the more chronic condition we have the after effect of one of the above traumatic or bacterial states. This may result in adhesions with serious impairment of heart function. Bacterial metastases from distant lesions not infrequently appear in the pericardial sac. We frequently see pericarditis in terminal infections. Extension of inflammatory processes in the lungs, pleura, mediastinum and peritoneum is frequently seen. There may be recovery in many of these, but I am pointing out also the various factors related to injury and disease which may result in heart pathology, temporary or permanent.

In consideration of the heart itself, I feel there are two main sub-divisions: pre-existing pathology etiologically unrelated to industry and pathology from or concurrent with industrial factors. Of the pre-existing pathology, probably endocarditis is the most common, either acute, subacute or chronic. Rheumatic heart disease has been the commonest offender with bacterial types other than that also responsibe, such as streptococcus hemolyticus, gonococcus, staphyloccus, and pneumococcus. It is not necessary to point out in great detail the train of events which may ensue when a valvular defective heart is put to the test by various factors herein discussed. The fact that it does exist prior to injury does not affect the employer's liability. The individual with a cor bovinum, for instance, when put to unusual effort or strain may find that effort the deciding factor from then on in his ability to work, and to live if he does not die.[8] Death from such cause has been accepted by insurance carriers. Congenital defects, either due to disease or anatomical in form, may determine just what labor a heart can do under certain emergencies that arise. Disturbances in the conduction system, resulting in arhythemias or various stages of block, often do not permit the heart to do its work, or at least deprive it of the reserve necessary when an unusual burden is placed upon it. Myocardial damage, with or without hypertrophy, is frequently present in individuals accepted for all sorts of physical labor. The courts have frequently awarded verdicts in favor of the insured who had severe myocardial damage when subjected to trauma from which they died and from which they undoubtedly would not have died had not the myocardial damage existed. "If by weakening resistance or otherwise, an accident so contributes or influences the progress of an existing disease as to cause the disability, it is sufficient to justify an award under that act."[9, 10, 11, 12, 13, 14, 15]

From pre-existing pathology, we turn to pathology from or concerned with industrial factors. We frequently see secondary bacterial endocarditis from infectious diseases and terminal infections. I readily admit that usually a previously diseased or abnormal endocardium is necessary, but not always.

Next we have our embolic phenomena of metastatic abscesses from injuries, from wounds and other traumatic phenomena. These emboli have lodged in various places, causing either ischemia, infarcts, or death. In consideration of the state of the muscle and chambers of the heart, we come to the question of acute dilatation. It is my belief that hypertrophy has preceded dilatation except in very acute dilatation, which is rare. Extreme effort in an already diseased or hypertrophied heart does cause dilatation.[16] Cardiac dilatation, acute or chronic, results in insufficiency, which in turn results in an accelerated heart rate even in sleep.[17] The maximum of that rate depends on two factors: the amount of work performed and the speed with which it is performed.[17] People with heart disease who show no signs of insufficiency of circulation during rest may be totally incapable of even mild exertion. The extra strain put upon the heart by muscular exercise calls forth the symptoms of circulatory insufficiency.[18] Accepting these facts, commissions and courts have awarded many decisions to the plaintiff. Usually these awards are made on the basis of cardiac failure as the result of the injury or occupation, but rarely we see awards for actual acute dilatation resulting in complete disability or death. I remember one case in particular in 1933 in which the Federal jury awarded a rather large sum to a rancher.[19] Pre-existing heart disease was definitely established and accepted. When he reached up to the height of his finger tips to pick an apple from the tree and then jumped about a foot, on the way down a clump of dirt crumpled beneath his feet and he came down on his feet with a jar. The effort and unexpected jarring, the jury decided, entitled him to an award for acute cardiac dilatation. This was in spite of a day's attempt on my part to convince the jury that such a condition would not result from such a simple act. You can see the possibility of many occasions arising from trauma, effort and disease in hearts *with* pre-existing or *without* pre-existing disease or disability where the question of relationship of liability may arise. All that has to be proved is that the work that was being performed, in other words, the employment, caused the injury or disease. A decision of our own Industrial Accident Commission well establishes this fact, as follows: "If the disability, although arising from a chronic heart trouble, was

brought on by any strain or excitement incident to the employment, the industrial liability still exists. Acceleration or aggravation of a pre-existing disease is an injury in the occupation causing such acceleration."[1]

Now we come to a discussion of the aorta, limited to its ascending portion and the arch. The chief pre-existing abnormalities in this vessel are two: congenital defects such as weakness from imperfection in development, and change in position in vessel arrangement such as variation in size from stenosis, etc. Aortitis may be present fairly often without physical signs. Radiology is often the only means of diagnosis. Dilatation of the arch itself is usually perceptible by careful physical examination, but dilatation of other parts can only be determined by radiology.[20]

We must admit the role of effort in an already diseased or distended aorta. In such a vessel "an effort or a wrench . . . may form a dissecting aneurysm . . ."[21] We have also seen spontaneous rupture of the aorta.[22] The commonest pathology aside from aortitis in this vessel is that of aneurysm. About 90% is due to syphilis, but what we and the insurance companies are concerned with is the result of extreme effort in cases of aneurysms, regardless of etiology. They occur with the greatest frequency in the arch, especially the first portion.[23] The part that effort plays is brought out by the frequency of aneurysms in the Negro race. The fact that they are from six to eight times more common in black than in white people is not only due to the increased incidence of lues but the heavy type of Negro labor.[24] We can dismiss the role of the aorta, then, by saying that the pathology related to industry is limited practically to two factors: first, traumatic phenomena resulting in rupture or aneurysm; second, effort phenomena resulting in dilatation, aneurysm, rupture of a pre-existing diseased aorta, aortitis, or the appearance of anginal pain, with or without disabling dyspnea.

NOW the most important phase of the whole problem here presents itself in the discussion of the coronary vessels. Let us consider the pre-existing pathology which etiologically is *unrelated* to industry: first, congenital anatomical abnormalities of which there are many, occurring frequently in the coronary vessels; and second, the effects of age, activity, disease, etc., resulting in sclerosis with destruction of the intima, hypotension with sluggish blood flow, hyperthyroidism infections resulting in changes in vessel walls, possible previous occlusion of varied extent, and blood changes affecting the coronary flow. To mention the pathology which may be *related* to industry, first, there is the exacerbation of some of the above pre-existing factors; second, a disabling or fatal outcome because of pre-existing pathology such as effort angina, acute dilatation, spasm of the vessels with resultant ischemia or myocardial infarcts; third, coronary thrombosis possibly from effort; and fourth, coronary occlusion as the result of vessel spasm while under great pressure from more intensive and frequent systole.

Some of the most acrimonious debates before the Commission and courts have been the varied medical opinions concerning coronary occlusion, thrombosis and angina pectoris. I was taught and have since believed that angina pectoris is a symptom and not a disease.[21] The cause of the pain in this condition has not been definitely located without question. Methods of relieving it have been evolved. I know that the trend of medical thought and opinion in coronary occlusion and often thrombosis, especially when death resulted, has been to deny industrial liability upon the basis that such a condition is more likely to occur when the heart is at rest, the blood pressure low and the blood flow sluggish, with tendency to clot formation. In the past, I have testified to that effect, but after observation and study it is my firm belief that such pathology can arise from effort. It is surprising how much the majority of the testimony has been against this theory and in favor of more coronary accidents occurring during rest than during effort. Insurance carriers have come so to expect such testimony that I was recently placed in the surprising but amusing position of being accused by a prominent insurance carrier of deliberate intent to mislead, and by one of the defendant physicians of giving different testimony from that which I gave in a case a few years ago. It reminded me of Osler's denunciatory remark about a physician who couldn't change his mind when he learned differently.

As an example of this theory, I shall quote briefly the only case history I submit in this discussion.[25] The plaintiff, a patient of mine, a chauffeur for some 13 years, whose work was always limited to driving an automobile, was called upon by his employer on August 6, 1934, to take off the front wheels and spring covers of a 12-cylinder Cadillac weighing 5,200 pounds. He jacked the car up, and between 10:00 A.M. and noon took off both wheels and replaced one. He began feeling badly when he had replaced one, and sat down. He rested a few moments, and then replaced the second wheel, and went under the car, removed the spring covers, and cleaned and oiled the springs. Still feeling badly, he went to lunch and on his way back had pains in both arms from the shoulders to the finger tips. By one o'clock he felt dizzy and faint and sat down in his automobile and fainted. He was unconscious for 20 minutes. He continued to have pain the rest of the day and around six o'clock he was seen by a physician, who advised him he was suffering from angina pectoris. The man continued to rest, and while he did so his pain was markedly relieved, but when he attempted any exertion it returned. This series of events went on for some months, but as time passed a little more exertion resulted in less pain until now he can do as much walking and ordinary things as he wishes without discomfort. His entire physical examination was negative except for a little dorsal spine arthritis playing no part in his disability. Unfortunately, no electrocardiogram was taken until some months after the original attack. It then showed moderate myocardial damage. The insurance carrier refused to accept the case as an industrial liability. The Commission heard the case. Several months went by in producing evidence, arguments and rebuttal of the other physicians. The referee, after lengthy deliberation, decided in favor of the plaintiff against the insurance carrier. The latter applied for a rehearing, which was granted, and the whole thing was reviewed by the Commission, and it, too, decided in favor of the plaintiff, allowing him 19 weeks' disability and medical and legal expenses for a part of that period.

The medical testimony of the defense rested primarily upon the factors that the man undoubtedly had sclerosis in his coronary vessels at the time he

took off the automobile wheels, and that no matter what he would have done in the course of that day or a later day the same thing would have happened whether he was working or not. As I have stated, the presence of a pre-existing condition does not lessen the liability of the employer. The fact that this man might have had this coronary attack while doing something else that day or some later day was true, but the facts remain that he had had none before, he was doing work which for him was of unusually severe exertion, and that it occurred while he was doing it.

I am aware of the differentiation which must always be under consideration, and that is this: whether or not the occupation causing the injury was unusual for the man performing it. In other words, if this individual had received this attack while he was sitting driving the automobile, which he had done for some years, I would not have fought for his cause. He was required to do something that day which for him was an unusual and very strenuous job, requiring great physical effort to which he was not accustomed. The fact that a coronary vessel may be sclerosed without evidence elsewhere of sclerosis, is true, but it *cannot* be proved until autopsy, and does not lessen the industrial liability.

We have really two views as to the mechanism of coronary pain; a defective coronary circulation, or a reflex mechanism from the first portion of the aortic arch, associated with tension of that vessel.[23] Various cardiac workers believe that bodily effort is the most common and most important of circumstances that produce an attack.[26] There is the rare patient "whose coronaries show no demonstrable lesion but a reflex spasm . . . causing marked constriction in some coronary branch."[23] "The mechanism of angina . . . appears to be primarily dependent on absolute or relative insufficiency in coronary circulation, giving rise to myocardial anoxemia."[24] "The more the coronary circulation is limited the less exertion is needed to cause angina pectoris."[24]

Paul White gives five definite causes of coronary insufficiency: one, disease of the coronary; two, coronary block at the mouth by aortitis; three, marked aortic regurgitation with low diastolic pressure; four, severe anemia; and five, *too great a demand on the heart muscles.* "It seems likely that more than one mechanism can cause the oppression . . . arteriospasm, general or coronary in some instances, and chronic narrowing with increased demands on the heart, another."[24]

Results of coronary disturbance would occur more often probably if it were not for the fact that "the myocardium has silent areas the same as the brain. Also, small infarcts may heal promptly. Thus coronary occlusion may occur without functional disturbance of the heart."[16] Bischoff, in Germany, states "it will hardly be maintained today that angina through exertion is nearly always a proof of organic alteration. The anatomist will not be able to state the diagnosis in this form of angina which is an angina of effort."[16] Let us remember that all organs "with increased output of energy require an increased supply of blood. This is furnished to the heart by the coronary. When through increased work, the supply is disturbed by some cause . . . organic or functional in nature, the organ receives less blood and ischemia results," with pain and a varying train of events.[16]

Now for just a moment let us go back to the question of coronary thrombosis and the oft-repeated testimony that it is more likely to occur in complete rest because of the low pressure. I remonstrate that this may not always be true. We must remember that at an advanced age hardly any aorta is free from alteration.[16] It is easy with aortic alteration or vegetative endocarditis for substances to be carried into the coronary vessels. I do not deny for a moment that a very low pressure during rest, with tendency to clotting, cannot produce coronary thrombosis. It most assuredly can, but, on the other hand, the coronary flow increases as the cardiac output increases.[27] "During . . . ventricular systole the coronary artery's flow is cut down to a minimum . . . with compression of the intramuscular branches of the coronary vessels."[27]

We know that ventricular systoles vary from a quarter to a third of a second, depending upon the heart rate.[27] Increased exertion means increased force of the heart beat and increased rate. The systole, therefore, is stronger and compression of the coronary vessels is greater during that fractional second of systole. The thin-walled left coronary might be depressed by a distended auricle.[16] The most important point, however, is the fact that at rest the output of the heart is five to eight liters per minute. During exertion this can increase up to 30 to 40 liters per minute from the left ventricle of the heart.[27] Thirty to 40 thousand cc. of blood, with its increased force and speed, rushing through abnormal aortic valves, or through an aorta with pathological walls, certainly would be more likely to carry with it foreign bodies into the coronary vessels.

Levine and Ernstene also refute the argument that low blood pressure at rest produces angina by less blood flow and, therefore, less blood in the myocardium.[28] They had blood pressure readings on 23 patients during attacks of angina pectoris. In seven of them the previous blood pressures were known, and their conclusion was that "temporary *elevation* of blood pressure is an important factor in the production of anginal attacks and may even be a necessary immediate cause of the attacks."

Thus the observations of others and myself have led me to believe that great and unusual effort, especially in the presence of pre-existing cardiac or aortic pathology, may cause coronary occlusion.

THE last question to be considered in this question of industry and cardiac pathology is the part of the blood. I shall merely mention the conditions existing in the blood stream which, it may readily be seen, may influence the rate and flow in the vessels as well as the specific gravity. They are the leukemias, thrombocytosis, severe anemias (primary and secondary), anoxemia such as carbon monoxide poisoning[29,30], asphyxia from insufficient oxygen and high altitude, increased blood viscosity due to polycythemia, extreme diarrheas, intestinal obstructions, burns, etc.

IN CONCLUSION, I have endeavored to bring out the following ideas:

1. That accidents and disease connected with industry may result in cardiac pathology, in a normal heart.

2. That hearts with varying pathology may, as a result of that pathology, be more susceptible to the effects of trauma and disease resulting from industry.

3. That pre-existing pathology in a heart does not render the insurance carrier any less liable if

illness or death were superinduced by the employment.

4. That I do *not* feel there is industrial liability in such cases *unless* the injured was subjected to *unusual* trauma, effort or disease in the course of his employment.

5. That undoubtedly coronary vessel occlusion can occur at rest with low blood pressure and sluggish blood flow, but that it is also reasonable to expect it from increased pressure with the greater liability of carrying valvular vegetations, aortic and coronary intimal tissue into the coronary circulation.

6. That angina pectoris is a symptom and not a disease, and when it first occurs during unusual physical effort, that effort should be recognized as the causative factor. To argue that the coronary vessels are sclerosed does not lessen the industrial liability.

I realize that there exists widespread difference of opinion in this subject, and I expect to hear it shortly, but as I do I shall remember a letter Sir Clifford Allbutt wrote to Bischoff wherein he stated, "but in difference there is life."

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Leukocytic Variations

GOODFELLOW performed systematic blood counts at intervals of from two to four weeks on 32 workers in radium and x-rays.[1] The periods of observation varied from six months to three years according to the duration of each individual's appointment. It has been found that there is only one sign of early over-exposure that is common to all workers. This is a leukopenia due to a reduction in the number of circulating neutrophils. There is evidence that different individuals vary in their susceptibility to the effects of irradiation, and those who are more sensitive exhibit an absolute lymphocytosis with an absolute neutropenia as a first sign of over-exposure. Others, who are less sensitive, exhibit a lymphocytopenia with a monocytosis under similar circumstances. Eosinophilia has frequently been seen as a result of over-exposure, and abnormal or embryonic leukocytes have occasionally been seen in the blood of certain workers. Vacations of less than four weeks do not appear to be of value in restoring the leukocyte count of an over-exposed worker to a normal level. The value of the information obtained by these routine blood counts has been greatly enhanced by periodic clinical examination of these subjects.

Poisoning and Porphyria

ROTH reports[2] a case of lead poisoning in which he investigated the relation between lead poisoning and the elimination of porphyrin. Every day he determined the quantity of urine, the elimination of porphyrin in the urine, the specific gravity of the urine, the erythrocyte values, the hemoglobin content, the reticulocytes and the resistance of the erythrocytes. The results of these studies are recorded in a table that also indicates the porphyrin content of the blood and feces. The porphyrin elimination in the urine and in the feces was greatly increased. In the erythrocytes the protoporphyrin was greatly increased. There was no clear parallelism between the clinical symptoms and the porphyrin elimination. The symptoms decreased at a time when the porphyrin elimination was still rather high. The injection of liver extracts had no noticeable effect on the porphyrin elimination.

1. *Brit. J. Radiol.*, December, 1935; abstr., *J.A.M.A.*, February 15, 1936.

2. *Ztschr. f. klin. Med.*, November 18 1935; abstr., *J.A.M.A.*, February 15, 15, 1936.

The Pneumonokoniosis Problem

in Industry

by

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THERE are today many problems of the pneumonokonioses in industry, and even to enumerate them — much less to discuss them — would be a veritable subject index of the pneumonokonioses.

So in discussing* *the* problem of the pneumonokonioses in industry, it is well to decide first what *the* problem is.

There is no great problem in the diagnosis of silicosis and certain other dust-born diseases of the lung. There is no question that when a man has a disability from silicosis he should be compensated.

And there is no question that members of the Illinois Manufacturers' Association and of other manufacturers' associations in other states are willing to compensate for such disabiltiy.

What, then, is *the* problem of the pneumonokonioses in industry?

The problem of the pneumonokonioses in industry today is the medicolegal jurisprudence aspect of suits filed against industry as silicosis or any other form of pneumonokoniosis. That is *the* problem.

There are certain etiological factors that have brought about "the problem":

First:—And one might well give priority to—certain fast thinking members of the legal profession.

Second: Certain colleagues of our medical profession appearing in the role of "expert witness," especially "Roentgen Ray Expert."

Third: The apathy of the Bar Association in the consideration of the medicolegal jurisprudence aspect of "the problem."

Fourth: The apathy of the Medical profession; city, county and state medical societies, the American Medical Association, the Roentgen Ray Societies, the local and the American Roentgen Ray Society, all have done little in a constructive way of modus operandi as to the medicolegal jurisprudence problem. The Institute of Medicine of Chicago deserves great credit for appointing a Committee to study the manner in which our State Industrial Courts are actually working out, under the Workmen's Compensation Acts, and it has requested its Committee to report on this subject, offering constructive suggestions. Other societies might well follow the example of the Institute of Medicine of Chicago.

IN THE preparation of this paper, the writer has gathered data from the study of 182 suits filed against *one company* during the period from 1932-1933 to date. The *ad damnum* in these various suits ranged from $25,000 to $75,000 each, giving a total *ad damnum* of about $9,100,000 against *one company*.

One or two doctors are regularly associated with the attorney, and a contact man—"runner" — completes the triad. The play is a fast one—like "Tinker to Evers to Chance"—a double play from "runner" to lawyer to doctor. A certain few doctors thus have played an important role in making a serious charge against industry.

In discussing the merits of suits instituted against industry, the pathology of the chest as portrayed by the x-ray is undoubtedly the most accurate check. Therefore, a review of all cases pending against *one company* in which we have been privileged to examine the x-rays has been made. We shall set forth the x-ray reports of the plaintiffs' physicians and follow with the reports of our readings of the x-rays. Then we shall draw our conclusions as to the merits of these cases.

In this review we have studied 30 cases. In 17 cases we have seen the x-rays and have the reports of the plaintiffs' physicians' reading of the x-rays.

In 13 cases we have examined the x-rays and made reports but have not seen the plaintiffs' physicians' reports of their x-ray readings.

The reports of the plaintiffs' physicians' readings of the x-rays and the reports of our (Warfield and Davis) readings are as follows:

CASE No. 1: Plaintiff's physician's report of reading of the x-ray: 12-8-33:

"Fluoroscopic examination of chest shows domes of both diaphragms to be flattened with obliteration of costophrenic angles and limited motion. The lower right side of retocardiac space is decreased. The films when viewed stereoscopically show the bony chest wall to be normal. The heart shadow is of the globular type. The right hilus region and trunk markings extending to right diaphragm are denser and larger than normal. There is an area of mild reticular fibrosis adjacent to right hilus region. There are areas of increased density in left apex and first intercostal space.

"Conclusions: The increased size and density of right hilus region with the character of adjacent fibrosis indicate moderate pneumoconiosis. The markings seen in upper part of left chest indicate tuberculosis. (.....M.D.)"

CASE No. 1 (a): Report of x-ray reading by Warfield and Davis:

"In the left infra-clavicular region there are several areas of density which are connected by Dunham's fan bands to the hilus. Diagnosis: Tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 2: Plaintiff's physician's report of reading of the x-ray, 12-9-33:

"Findings: Fluoroscopic examination of chest shows domes of diaphragms to be well rounded,

*Read before the joint meeting of the Chicago Medical Society and the Central States Society of Industrial Medicine and Surgery, January 15, 1936, at Chicago.

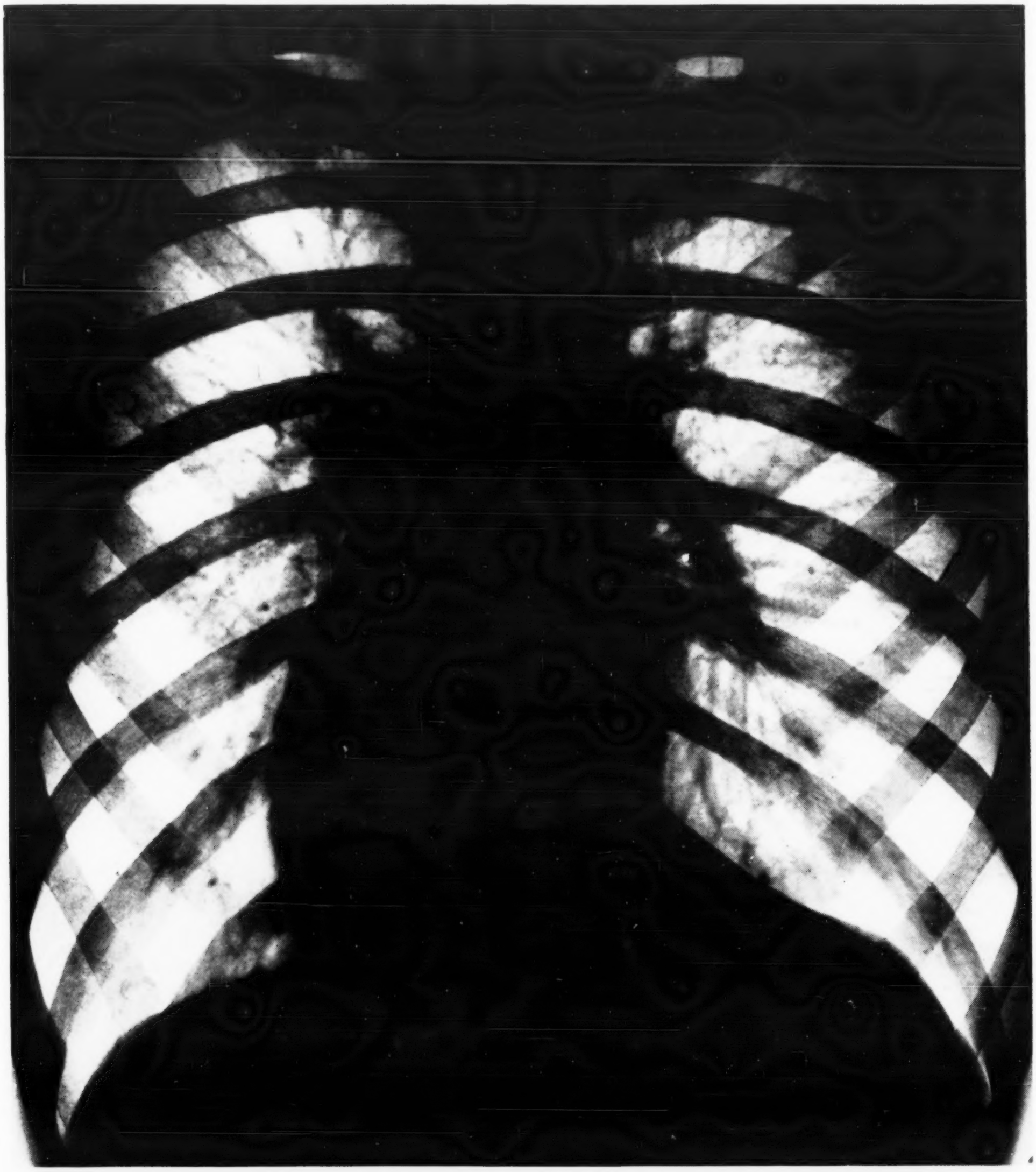

Fig. 1. Healthy Adult Chest. Lung Fields:
(a) Hilus on inner third contains glands, large bronchi, arteries, veins and lymphatics, drainage area of the lung
(b) Middle third area composed of smaller bronchi, blood vessels and lymphatics; lines are small and delicate
(c) Outer third zone or area; there are no white lines except in the base of the lung
(d) Increase of the lower right hilus is usually from sinus and upper respiratory diseases
(e) Calcified glands, old tuberculosis

freely movable and with clear costophrenic angles. The retrocardiac space is clear. The films when viewed stereoscopically show the bony chest wall to be normal. The heart shadow is normal. There is increased size and density of hilus regions and trunk markings extending to diaphragms. There are small calcified areas in and around both hila. There is decided increase in reticular fibrosis adjacent to left hilum. A similar condition is seen on the right side but in a lesser degree. There is no decided nodular formation seen in this chest. There is increased linear fibrosis extending into

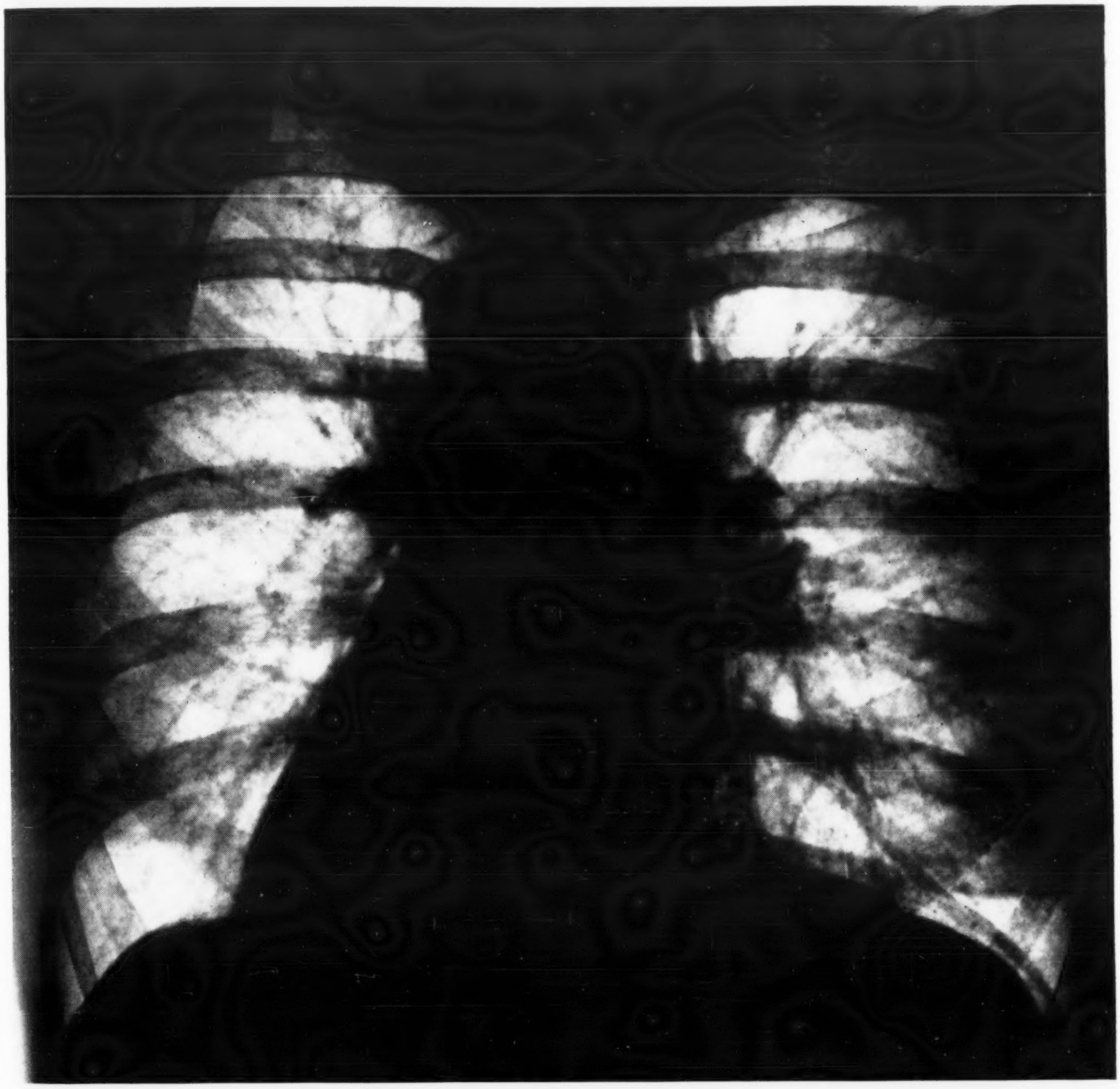

Fig. 2. Case to represent statement (d)
Increase of the lower right hilus is usually from sinus and upper respiratory diseases

upper part of both sides of chest with some tendency toward the formation of periphery.

"Conclusions: The calcified areas seen in hilus regions indicate healed childhood tuberculosis. The reticular fibrosis adjacent to hilus regions indicates moderately advanced pneumoconiosis. The condition seen in upper part of chest is very suggestive of early tuberculosis. This case should be watched for further development of the tuberculous condition (.....M.D.)"

CASE NO. 2 (a): Report of x-ray reading by Warfield and Davis:

"Healthy chest. No evidence of tuberculosis. No evidence of silicosis. No disability as the result of dust."

CASE NO. 3: Plaintiff's physician's report of reading of the x-ray, 11-8-33:

"Findings: Stereo film examination of the chest shows the following:

"The costophrenic angles are clear. The domes of the diaphragm were negative. The heart and aorta were normal. The hila marking increased, showing the presence of a mild chronic irritation. Moderate tuberculous markings were noted in both upper lobes. The findings at present show a definite tuberculous lesion in both upper lobes. The evidence of hila enlargement indicates a chronic irritation from some cause which may be affecting the tuberculous lesion secondarily. (.....M.D.)"

CASE NO. 3 (a): Report of x-ray reading by Warfield and Davis:

"There are a number of soft round areas in the left infra-clavicular space which are indicative of tuberculosis. The remaining portion of the lung is negative. There is no evidence of silicosis. No disability from silicosis."

CASE NO. 4: Plaintiff's physician's report of reading of the x-ray, 12-5-33:

"Findings: Fluoroscopic examination of chest

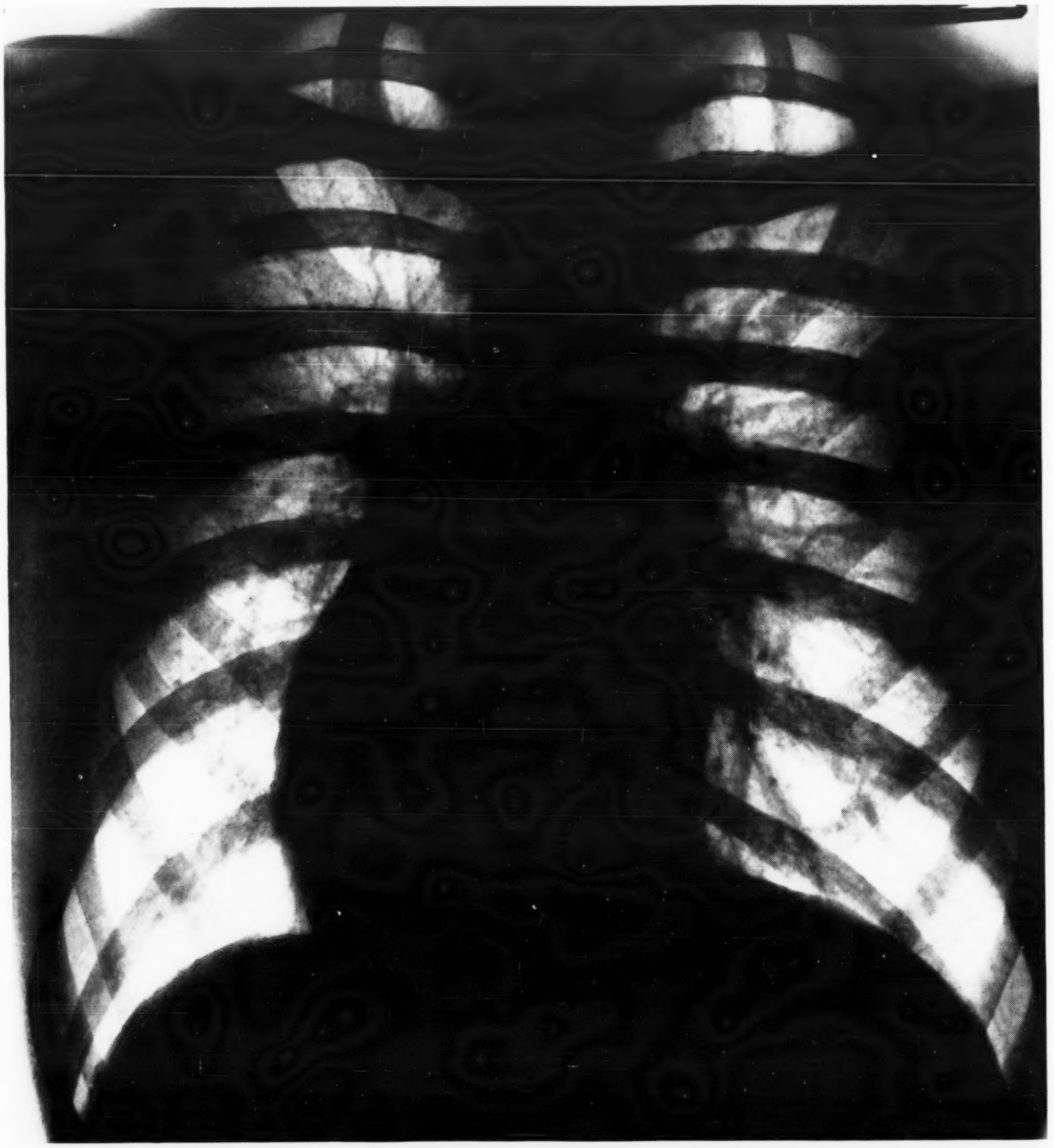

Fig. 3. Case of bronchial asthma with increase of the bronchio-vascular markings

shows domes of diaphragms to be well rounded, freely movable with clear costophrenic angles. The retrocardiac space is clear. The films when viewed stereoscopically show the bony chest wall to be normal. The heart shadow is held in somewhat horizontal position with slight bulging on right side. The left side has a clear outline. There is more than normal density of hilus regions and more than normal size and density of linear markings extending to diaphragms. There is some calcification in left hilus region. There is increased bronchial fibrosis in upper part of chest on both sides.

"Conclusions: There is sufficient fibrosis and nodular formation in lower part of chest for a diagnosis of pneumonoconiosis. (.....M.D.)"

CASE No. 4 (a): Report of x-ray reading by Warfield and Davis:

"Negative. No tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 5: Plaintiff's physician's report of reading of the x-ray, 12-20-33:

"Fluoroscopic examination of chest shows domes of diaphragms well rounded, freely movable with clear costophrenic angles. The retrocardiac space is decreased. The films when viewed stereoscopically show the bony chest wall to be normal. The heart shadow is of the globular type with decided dilation on the right side. There is increased size and density of hilus and trunk markings. There

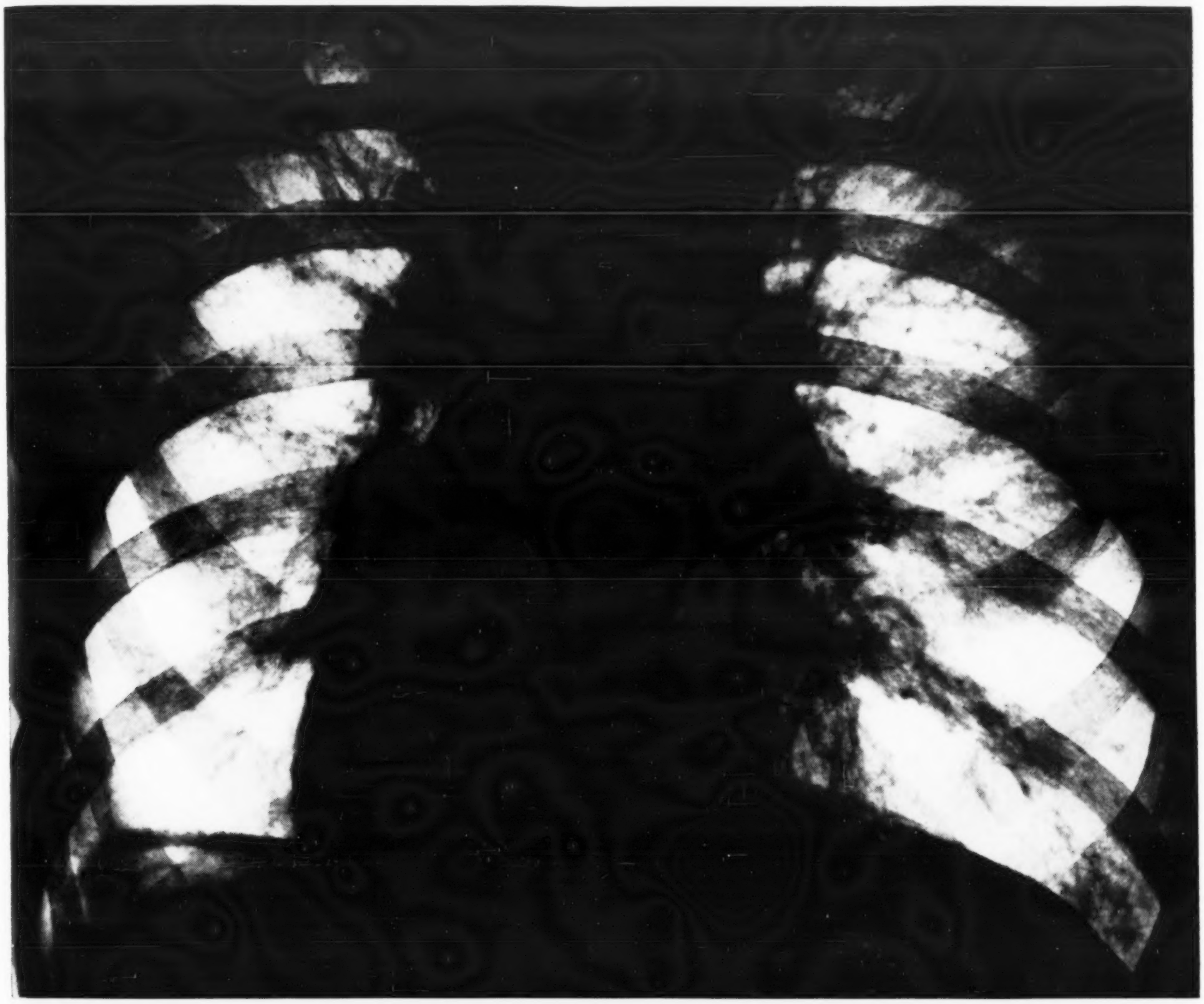

Fig. 4. This man has worked for many railroads and was never exposed to dust, yet he has frequent chest colds nearly every winter; this gives him a marked increase of the bronchio-vascular markings

is an increase in reticular fibrosis with nodulations adjacent to lower part of both hila. There is increased linear fibrosis in the upper part of chest.

"Conclusions: The nature of the fibrosis in the lower part of chest indicates pneumoconiosis and shows that the heart disturbance is due to the chest condition rather than a causative factor. The fibrotic condition in the upper part of chest is probably due to circulatory disturbance. (..... M.D.)"

CASE No. 5 (a): Report of x-ray reading by Warfield and Davis:

"Negative chest. No tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 6: Plaintiff's physician's report of reading of the x-ray, 12-8-33:

"Fluoroscopic examination of chest shows domes of diaphragms to be well rounded, fair motion and clear costophrenic angles. The retrocardiac space is decreased. The films, when viewed stereoscopically, show the bony wall to be normal. The left side of heart shadow is normal with clear outline. The right side shows distinct bulging. There is more than normal size and density of hilus regions and trunk markings extending to diaphragms. There are a few calcified areas to be seen in hila. There is increased fibrous density with some nodular formation, more pronounced in the upper part of the chest.

"Conclusions: It is evident that the lesion of right heart is secondary to the fibrosis seen in the chest rather than a causative factor from circulatory congestion as circulatory congestion would be seen more in lower part of chest and would not contain the nodules seen in this case. This is clearly a case of well advanced pneumonoconiosis, which has affected the right side of the heart. (.....M.D.)"

CASE No. 6 (a): Report of x-ray reading by Warfield and Davis:

"X-ray negative. No tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 7. Plaintiff's physician's report of reading of the x-ray, 11-20-33:

"Findings: The films when viewed stereoscopically show the right diaphragm somewhat peaked with clear costophrenic angles. The left diaphragm shows adhesion near inner border and has clear costophrenic angles. The bony chest wall is normal. The heart shadow is smaller than normal, inclined to be tubular with some bulging of right side. There is emphysema in lower part of

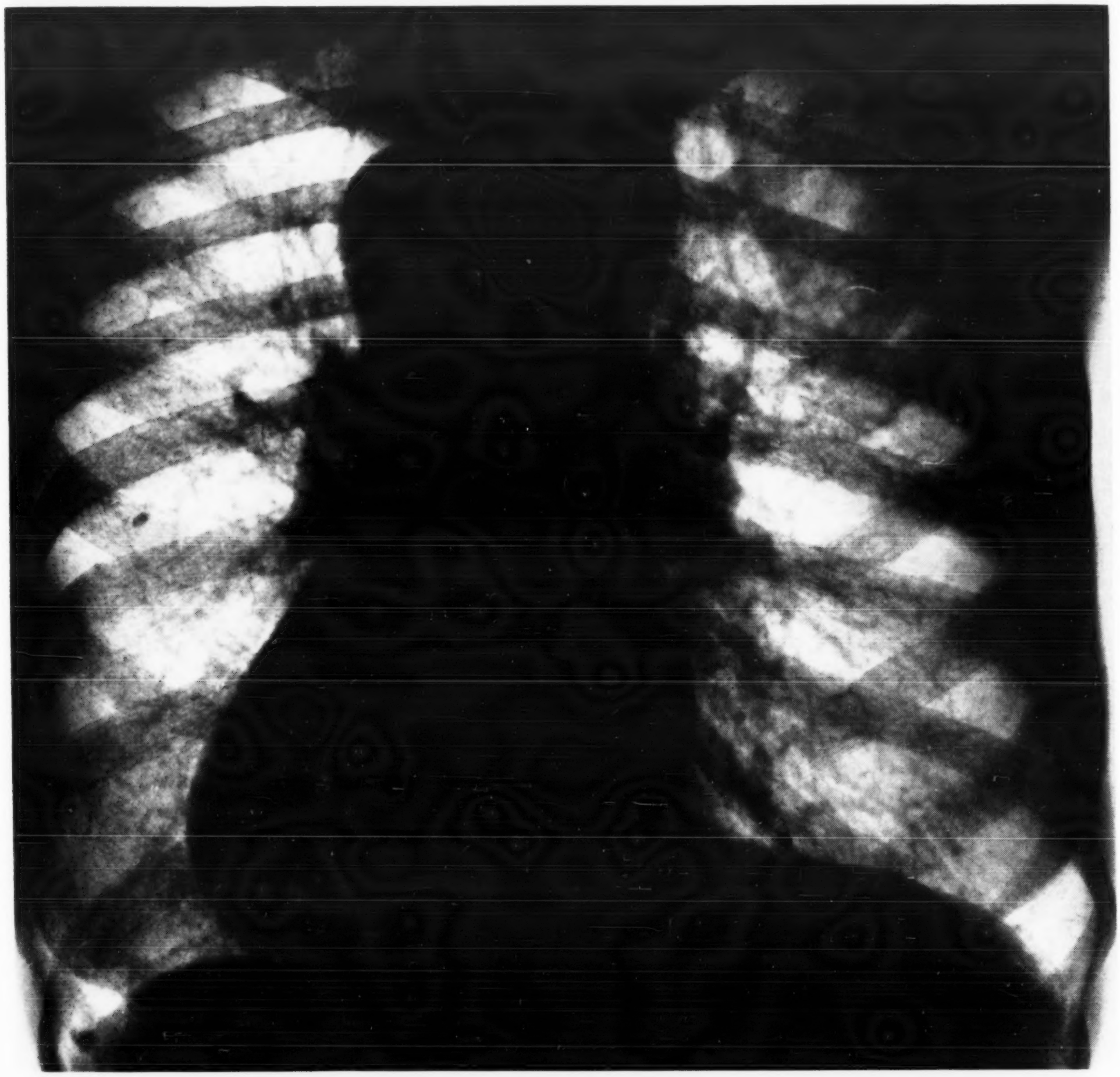

Fig. 5. This old lady, 70 years old, has considerable fibrosis and was never exposed to dust

both of hila and trunk markings. There is fine ground-glass increase in density in the upper two-thirds of both sides of the chest. This contains many small nodules. There is some peripheral fibrosis in upper part of both sides of chest.

"Conclusions: There is advanced pneumonoconiosis in upper two-thirds of chest with emphysema in lower part of chest. The peripheral fibrosis in upper chest is very suggestive of early tuberculosis. (One of these films is badly damaged and should be retaken if this becomes a court case). (. . . . . M.D.)"

CASE No. 7 (a): Report of x-ray reading by Warfield and Davis:

"X-ray findings are negative. No tuberculosis. No silicosis. No disability from dust."

CASE No. 8. Plaintiff's physician's report of reading of the x-ray, 12-18-33:

"Findings: Fluoroscopic examination of chest shows diaphragms well rounded, freely movable with cloudy costophrenic angles. The retrocardiac space is cloudy and decreased. The films, when viewed stereoscopically, show the bony chest wall to be normal. The heart shadow is increased in its horizontal diameter with bulging of the right side. There is increased size and density of hilus regions and trunk markings, more pronounced on the right side. There is small increased reticular fibrosis adjacent to lower portion of left hilum with several areas of bronchiectasis in left side of chest. There is decided reticular fibrosis throughout all of right side of chest with nodular formation in both sides of chest.

"Conclusions: This is an advanced case of pneumonoconiosis. (. . . . . M.D.)"

CASE No. 8 (a): Report of x-ray reading by Warfield and Davis:

"Healthy chest. No tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 9: Plaintiff's physician's report of reading of the x-ray, 11-15-33:

"Stereo films of the chest present the following findings: The costophrenic angles are clear. The domes of the diaphragm are negative. The heart

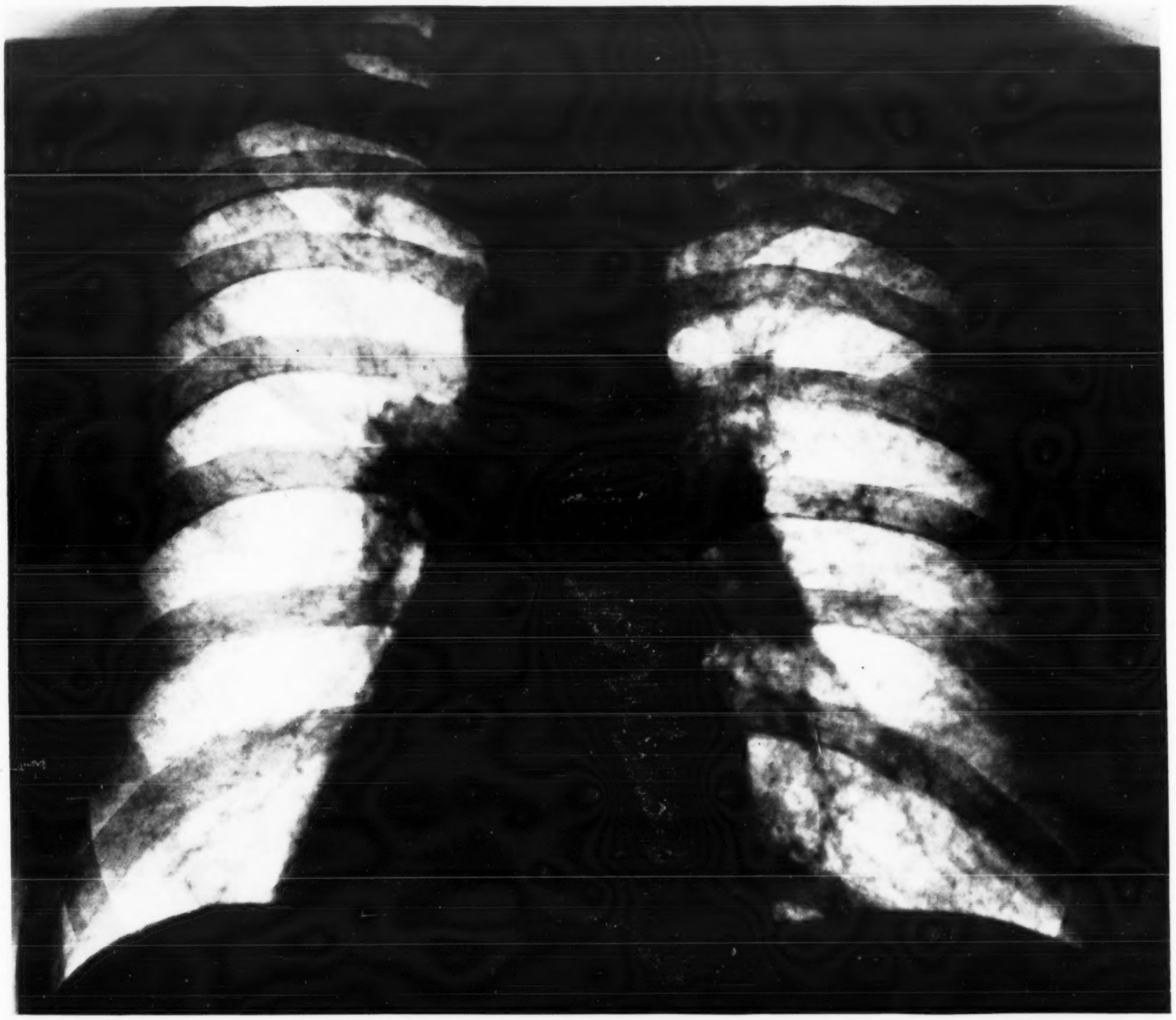

Fig. 6. This stationary engineer was never exposed to dust, yet has increase of the bronchio-vascular markings. These cases represent the changes that may occur in patients' chests over a span of years, yet they have no symptoms or findings referable to their lungs. Since this is true one can say that they are within the range of a healthy adult chest for a person of this age. These cases also show how much fibrosis one can have in the lungs and still never have worked in a dusty trade

is slightly enlarged. The hila markings and the lower lung fields are definitely increased and are of such a nature as to indicate chronic irritation. As a cause of this type bronchial irritation pneumonoconiosis must be considered. (. . . . . Roentgenologist)."

CASE No. 9 (+): Another plaintiff's physician's report of reading of the x-ray:

"Findings: The films when viewed stereoscopically show normal curve to left diaphragm which has clear costophrenic angle. The right diaphragm is very irregular due to adhesions. Right costophrenic angle is clear. The bony chest wall shows excessive calcification in lower costal arches. The heart shadow shows very indistinct outline, lower than normal in transverse diameter. There is a very irregular right border of heart which should be diagnosed from its behavior under the fluoroscope. There is a moderate increase in the size and density of hila and trunk markings which contain some calcified areas. There is a reticular fibrosis in lower part of both sides of chest which contain many small nodules.

"Conclusions: The calcified areas indicate healed childhood tuberculosis, which must have been quite advanced to cause the adhesions in right diaphragm. The fibrotic areas with nodules in lower part of chest indicate moderately advanced pneumoconiosis. There is no x-ray evidence of active tuberculosis to be seen in these films but the healed childhood condition is a potential danger and may break down at any time. (. . . . . M.D.)"

CASE No. 9 (a): Report of x-ray reading by Warfield and Davis:

"Negative chest. No tuberculosis. No silicosis. No disability from dust."

CASE No. 10: Plaintiff's physician's report of reading of the x-ray, 11-8-33:

"Findings: Stereo film examination of the chest showed the following findings: The costophrenic angles were clear. The domes of the diaphragm

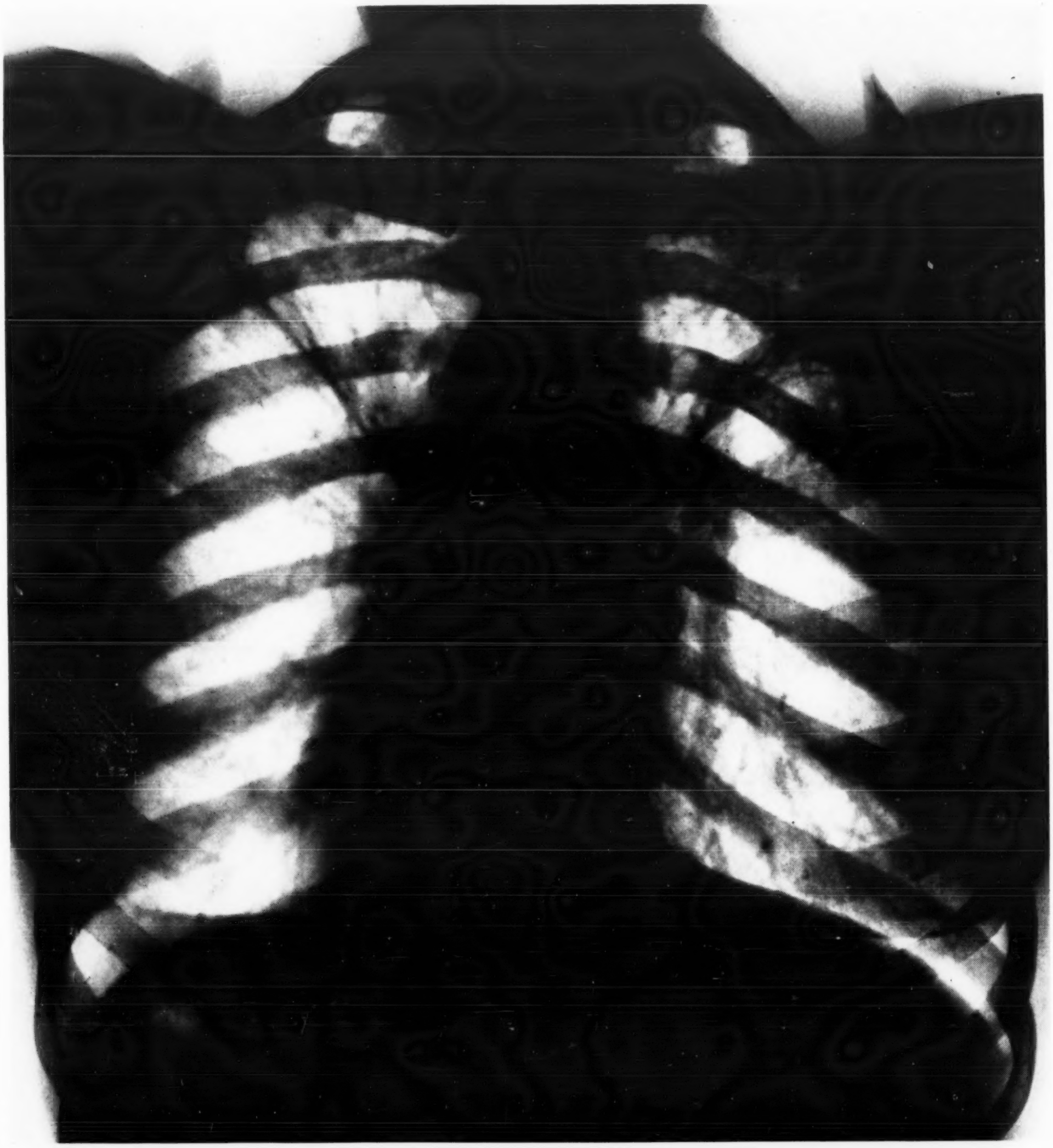

Fig. 7. This is merely a case of bilateral apical tuberculosis, probably healed as evidenced by the fibrosis, yet he should be rejected in the employment office because of his susceptibility to further infection. The x-ray is the only method of detecting this condition. Dr. Lawrason Brown states that tuberculosis is diagnosed by x-ray in 99+% of cases where the other methods of physical examination are accurate to about 60%

were negative. The heart and aorta were normal. The hila markings were considerably increased, particularly on both sides. From the hila, linear and irregular shadows extended out in the lung fields, forming many nodular arrangements in some areas and vacuolization areas in others. There is no evidence of active tuberculosis. The findings are characteristic for a mild to moderate degree of silicosis. (..... M.D.)"

CASE No. 10 (+): Another plaintiff's physician's report of reading of the x-ray:

"The films, when viewed stereoscopically, show the diaphragms well rounded with clear costophrenic angles. There is increased size and density of hilus regions and trunk markings, more pronounced on the right side. There is emphysema in apex and base of chest on both sides. There is reticular fibrosis adjacent to both hila. These contain some nodule formations.

"Conclusions: This is a medium case of pneumonoconiosis."

CASE No. 10 (a): Report of x-ray reading by Warfield and Davis:

"X-ray findings negative. Healthy chest. No

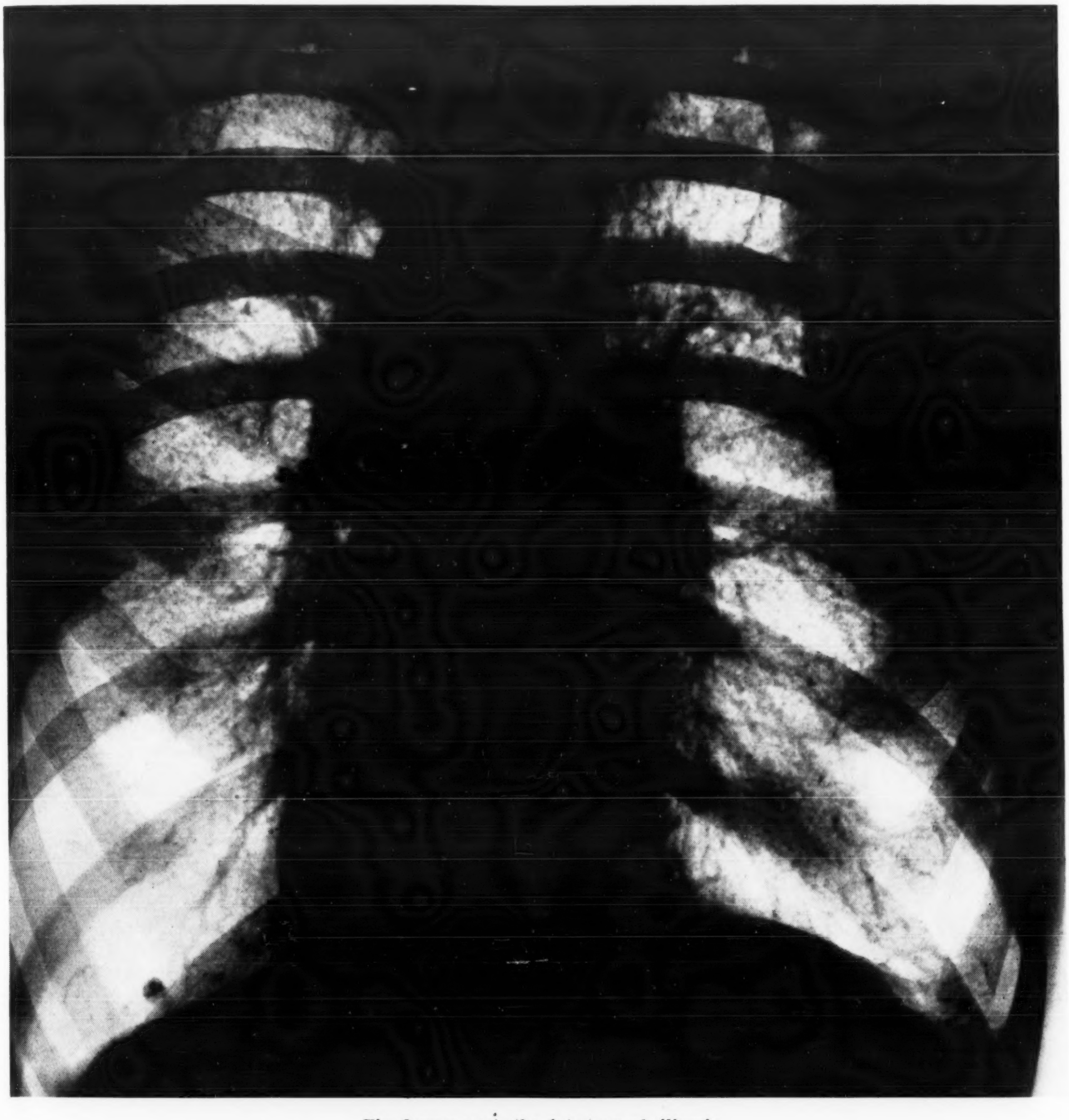

Fig. 8 represents the 1st stage of silicosis
(Figs. 8, 9 and 10 represent the three stages of silicosis yet only the 3rd stage having symptoms, mainly dyspnea. This fibrosis is different from that in cases 1, 3, 4, and 5, in that it presents a reticulation, with the apices and bases comparatively free from pathology, the greatest density being in the hilus area, and the infiltration spreading outward like the roots of a tree. Silicosis is ALWAYS BILATERAL and DOES NOT AFFECT JUST ONE SMALL AREA OF THE LUNG)

tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 11: Plaintiff's physician's report of reading of x-ray, 12-7-33:

"Stereo of chest: Fluoroscopic examination of chest shows domes of diaphragms to be well rounded, freely movable with clear costophrenic angles. The retrocardiac space is clear. The films, when viewed stereoscopically, show indication of old fracture of second, third and fourth ribs near nipple line on left side. There is no effusion of the pericardial region and trunk markings extending from both hila to diaphragms. There are small areas of calcification seen in both hila. There is an area of reticular fibrosis adjacent to lower two-thirds of right hilum with no nodular formation at this time.

"Conclusions: The calcified areas seen in both hila indicate healed childhood tuberculosis. The enlargement and increased density of right hilus regions indicate infectious process in right side of chest. The fibrosis adjacent to this area indicates an early state of pneumoconiosis. The enlarged right heart indicates disturbance of circulation in chest. (.....M.D.)"

CASE No. 11 (a): Report of Warfield and Davis:

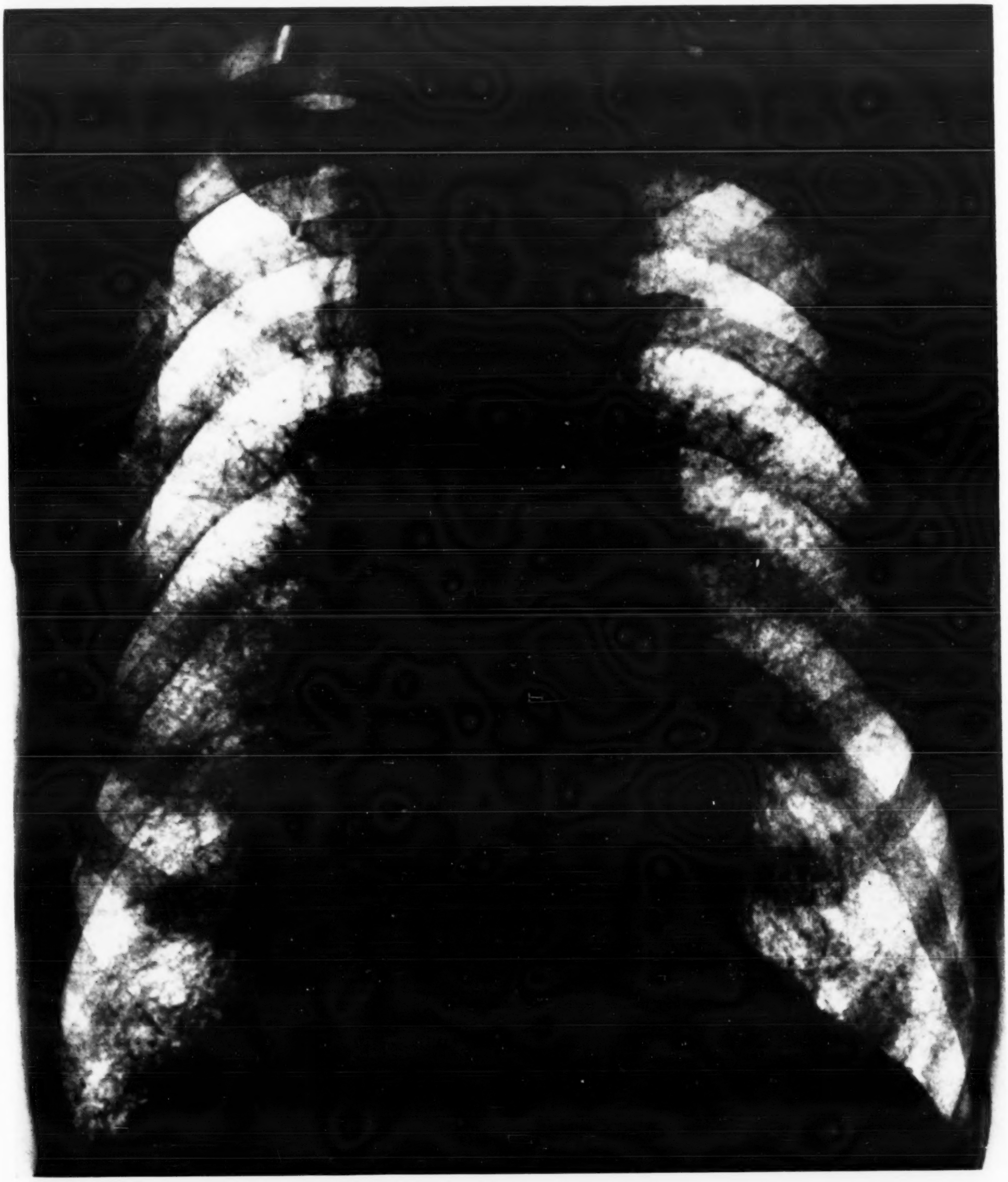

Fig. 9 represents the 2nd stage of silicosis

"X-ray is negative. No tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 12: Plaintiff's physician's report of reading of the x-ray, 11-8-33:

"Findings: Stereo films of the chest showed the following findings: The costophrenic angles were clear. The domes of the diaphragm were normal in position but showed a few adhesions. The heart and aorta were negative. The hila markings were considerably increased and showed old calcified foci. The lung fields show a moderate increase in markings. Thickened old pleuritis was noted in the right apex. The total findings may well be due to a chronic pulmonary irritation due to dust inhalation. (. . . . . M.D.)"

CASE No. 12 (a): Report on x-ray reading by Warfield and Davis:

"Healthy chest. No evidence of active tuberculosis. No evidence of silicosis. No disability as the result of dust."

CASE No. 13: Plaintiff's physician's report of reading of x-ray, 12-5-33:

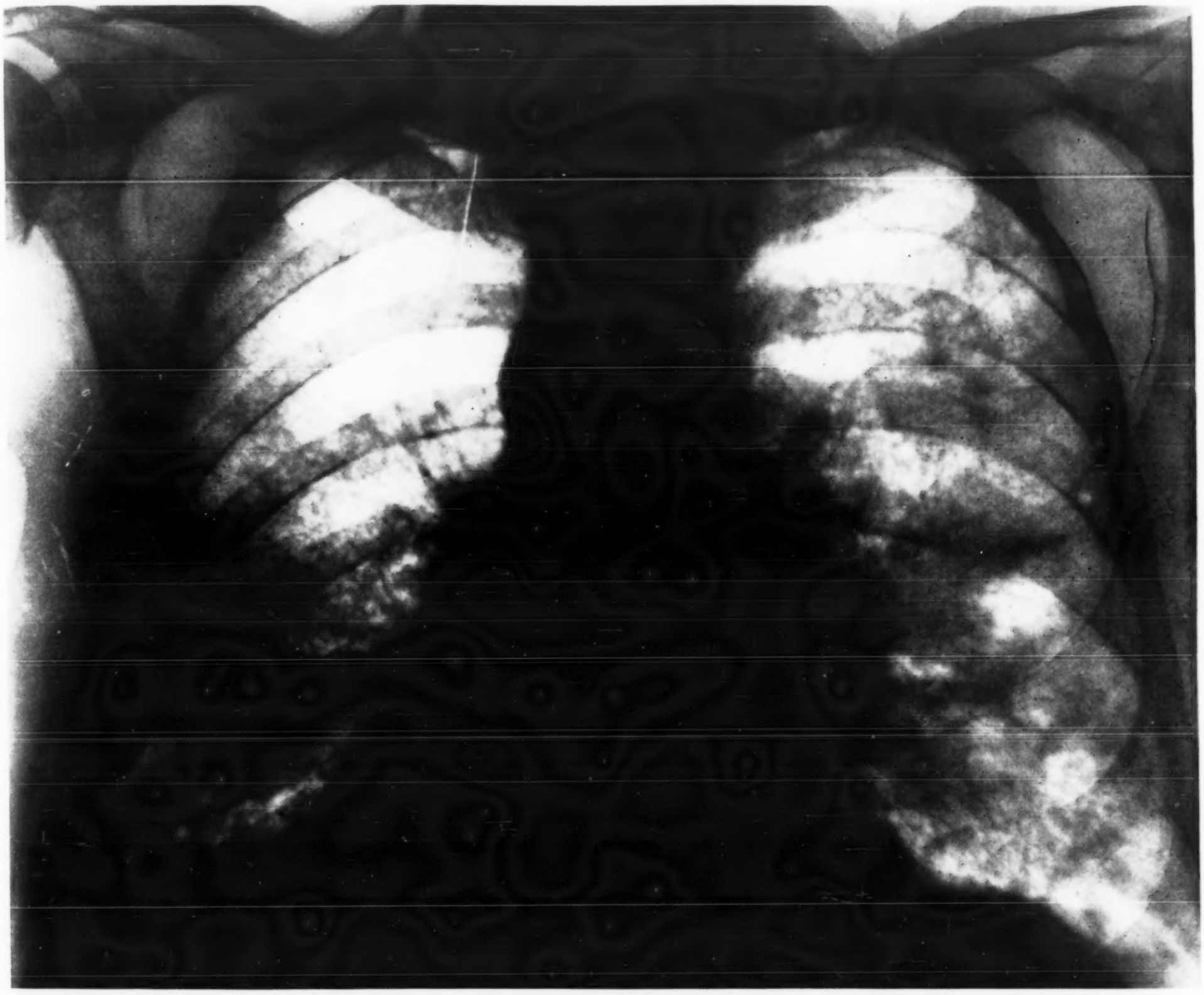

Fig. 10 represents the 3rd stage of silicosis

"Findings: Fluoroscopic examination of chest shows domes of left diaphragm to be well rounded, freely movable with clear costophrenic angle. The retrocardiac space is narrowed. The films, when viewed stereoscopically, show the bony chest wall to be normal. The heart shadow is clear in outline, of the globular type with some expansion of right side of heart. The lower part of chest is somewhat expanded and emphysematous. There is more than normal density of hilus regions and trunk markings extending to diaphragm. There is fine reticular fibrosis adjacent to both hila with increased fibrosis extending toward apices.

"Conclusions: The fine reticular fibrosis in mid portion of chest indicates moderate pneumoconiosis. (..... M.D.)"

Case No. 13 (a): Report of x-ray reading by Warfield and Davis:

"Negative. No tuberculosis. No silicosis. No disability as the result of dust."

Case No. 14: Plaintiff's physician's report of reading of the x-ray, 10-30-33:

"Fluoroscopic examination and stereoscopic films of chest, when films are viewed stereoscopically, show diaphragms to be well rounded, freely movable with clear costophrenic angles. The bony chest wall shows some abnormal expansion in lower portion with old fractures of seventh and eighth ribs in mid scapular and axillary lines on right side. The outline of heart is somewhat fuzzy, slightly under size with mild enlargement of right side. There is more than normal size and density of right hilus region and linear markings extending to right diaphragm. There is a very slight increase in the fibrosis near right hilus region.

"Conclusions: I do not consider this case, in view of the x-ray findings, an advanced pneumoconiosis. (..... M.D.)"

Case No. 14 (a): Report of x-ray reading by Warfield and Davis:

"Healed fracture eighth rib posteriorly right side median scapular line region. No tuberculosis. No silicosis. No disability as the result of dust."

Case No. 15: Plaintiff's physician's report of reading of the x-ray, 11-28-33:

"Findings: Fluoroscopic examination of chest shows irregular outline of domes of both diaphragms with obliteration of right costophrenic angle. The left costophrenic angle is clear. There is restricted motion of both diaphragms. The retrocardiac space is clear. The films, when viewed stereoscopically, show the bony chest wall to be normal. The heart shadow is essentially normal. There is increased density of hila and

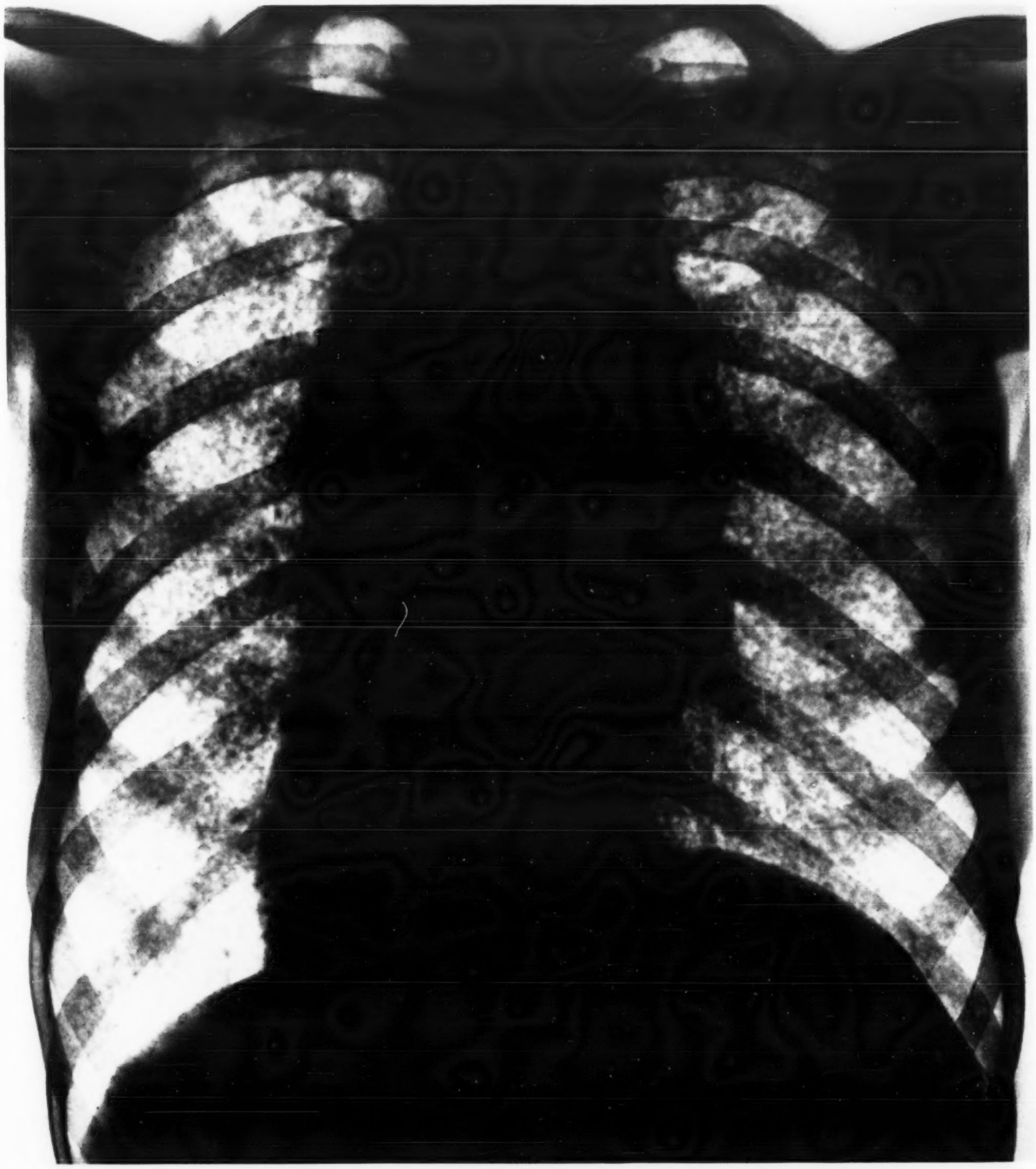

Fig. 11. This case is one of miliary tuberculosis showing a different character in the infiltration to an experienced, trained eye. Notice that it is bilateral also, but that no one part of the lung is spared, while in the previous cases the apices and bases were not involved

linear markings extending to diaphragms. There are numerous small calcified areas in both hila and a larger calcified area near periphery at the level of fifth rib anteriorly. There is a ground-glass density adjacent to lower part of both hila. This is more pronounced on the right side.

"Conclusions: The deformity of diaphragms with their limited motion, together with the increased density of hila and trunk markings, and the ground-glass fibrosis, indicates healed childhood tuberculosis. (.....M.D.)"

CASE No. 15 (a): Report of x-ray reading by Warfield and Davis:

"Gohn's tubercle right lung, lower lobe, known as a primary complex. Healed tuberculosis childhood; no active tuberculosis present. No silicosis. No disability as the result of dust."

CASE No. 16: Plaintiff's physician's report of reading of the x-ray, 11-23-33:

"Findings: Fluoroscopic examination of chest shows irregular dome of right diaphragm. Left diaphragm is somewhat flattened, with oblitera-

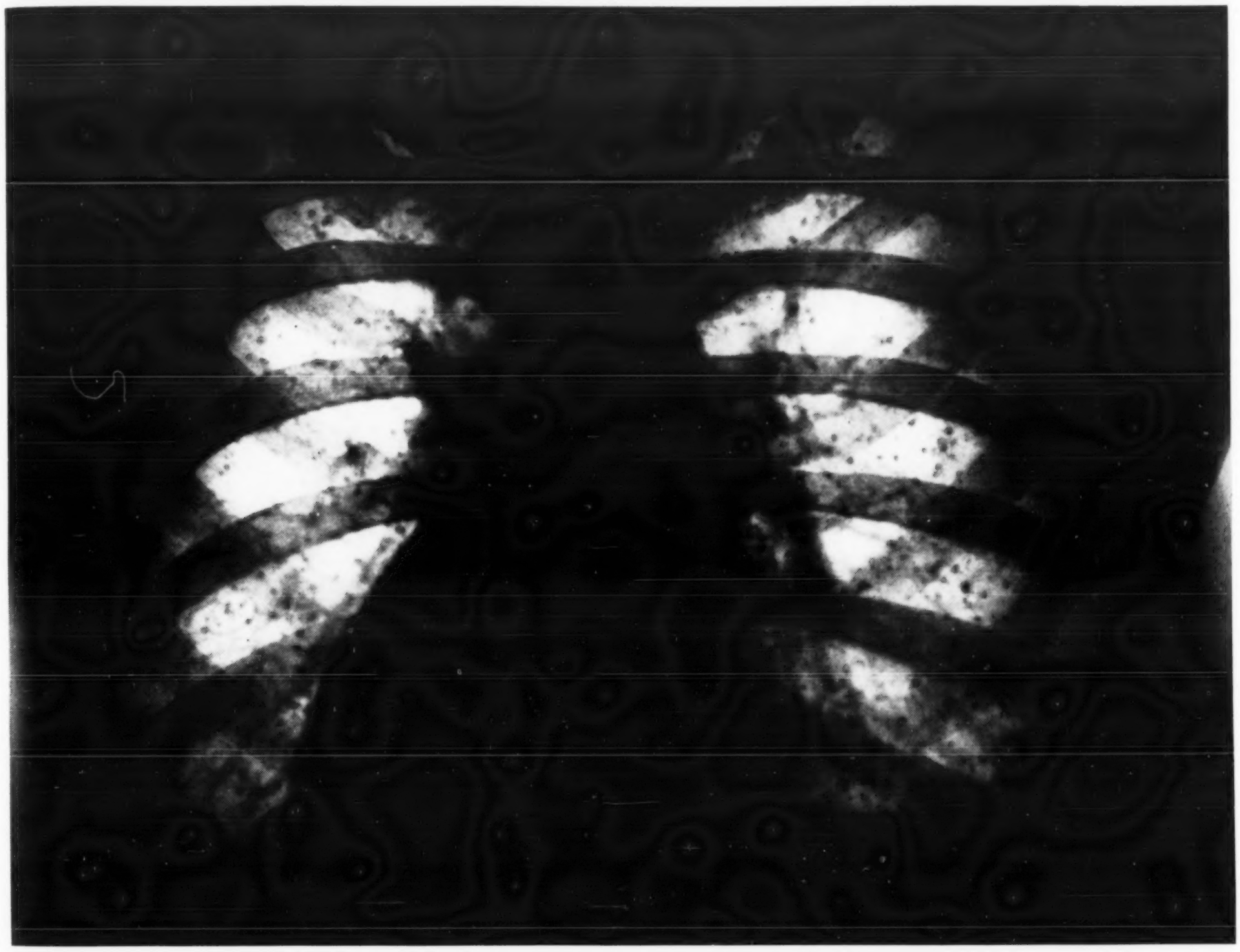

Fig. 12. These dense white, bird-shot-like, areas are healed lesions of miliary tuberculosis

tion of costophrenic angle. There is an abnormal finger-like density to be seen in right costophrenic angle. There is limited motion of both diaphragms. The retrocardiac space is cloudy. The films, when viewed stereoscopically, show bony chest wall to be normal. The heart shadow is normal as regards size, shape and position and has clear outline. There is a slight increase in the density of right hilus and linear markings extending to diaphragm. There is emphysema in the lower part of both sides of the chest. There is decided fibrosis involving both apices with some cavity formation.

"Conclusions: The major pathology in this case consists of the advanced tuberculous condition seen in both apices. (. . . . . M.D.)"

CASE No. 16 (a): Report of x-ray reading by Warfield and Davis:

"Bilateral apical tuberculosis. No silicosis. No disability as the result of dust."

CASE No. 17: Plaintiff's physician's report of reading of the x-ray, 12-19-33:

"Findings: Fluoroscopic examination of chest shows diaphragms held very high, fairly movable and cloudy costophrenic angles. The retrocardiac space is cloudy and decreased. The films, when viewed stereoscopically, show the bony chest wall to be somewhat expanded in the lower portion. There is decided bulging of right side of heart. There is calcification in and around both hila. There is fine reticular fibrosis in lower part of both sides of chest. There are slight nodule formations in lower right side.

"Conclusions: The fibrosis seen in this case can be differentiated from circulatory congestion by the fineness and the reticular formation. That seen in circulatory congestion is much coarser and does not have the reticular formation. This is a moderately advanced case of pneumoconiosis with the heart condition as a result rather than a cause. (. . . . . M.D.)"

CASE No. 17 (a): Report of Warfield and Davis:

"Healthy chest. No tuberculosis. No silicosis. No disability as the result of dust."

In the following 13 cases we saw no plaintiff's physician's readings of the x-ray. Hence, we tabulate only our (Warfield and Davis) reading of the x-rays. They are as follows:

	Healthy Chest	T.B.	Silicosis	Disability as the result of dust
1	—	—	—	—
2	x	—	—	—
3	—	—	—	—
4	x	—	—	—
5	x	—	—	—
6	—	—	—	—
7	—	x	—	—
8	x	—	—	—
9	—	—	—	—
10	x	—	—	—
11	—	—	—	—
12	x	—	—	—
13	x	—	—	—
Total	7	1	0	0

Summary: An outline of the summary of the reports by us (Warfield and Davis) of the first 17 cases is as follows:

	Healthy Chest	T.B.	Silicosis	Disability as the result of dust
1	x	—	—	—
2	—	x	—	—
3	x	—	—	—
4	x	—	—	—
5	—	x	—	—
6	x	—	—	—
7	x	—	—	—
8	x	—	—	—
9	x	—	—	—
10	x	—	—	—
11	x	—	—	—
12	x	—	—	—
13	x	—	—	—
14	x	—	—	—
15	x	—	—	—
16	—	x	—	—
17	—	x	—	—
Total	13	4	0	0

Conclusions: Having examined x-rays of 30 cases we found five cases of tuberculosis, no cases of silicosis and no cases which showed disability as the result of dust.

The conclusion, therefore, is that in these 30 cases, the total *ad damnum* being approximately $1,500,000, there is no merit in these 30 suits which have been instituted against *one company*.

In analyzing these 17 cases, all filed by one attorney, it is interesting to note that one doctor sired the plaintiff's x-ray report in all 17 cases. As consorts who added their x-ray reports, there were three other doctors: one in 12 of the cases and two others in four of the cases.

As these suits, all filed by one attorney, carry an *ad damnum* of $50,000 each, these 17 cases all reported by four doctors within a period of one month and 21 days in 1933, would carry a total *ad damnum* of $350,000 against *one company*. That, gentlemen, is *the* problem of the pneumonokonioses in industry.

As one carries always a different fingerprint, a different cranial contour from any other, so he has a different dust experience. If the staubosphere had one common value in particle, number or kind, this could hardly be. But it decidedly has not, and, as pointed out by Blackstin, a whole gamut of gradations from relatively sparse (over ocean and mountains) to relatively dense volume value (over cities) exists.

The fibrosis of the lungs, as portrayed by the Roentgen rays, accordingly registers a composite picture of the result of a man's life environment of not only dusts but various diseases: asthma, bronchitis, results of upper respiratory diseases, tuberculosis, cancer of the lungs, etc.

The 15 illustrations which are here shown, with their legends, demonstrate the problem of interpreting fibrosis of the lung with its relation to pneumonokoniosis.

Municipal and County Institutions Combed

NOT finding silicosis cases frequent enough, but knowing that tuberculosis is the end result of silicosis, certain lawyers have their doctor member of the triad comb the tuberculosis ward at the Cook County Hospital, the City of Chicago Municipal Tuberculosis Sanitarium and the Cook County Infirmary and Cook County Tuberculosis Hospital at Oak Forest for cases of tuberculosis that have worked for industries. They not having silicosis, the suits are generally filed as "pneumonokoniosis" and tuberculosis. The speaker has documentary evidence of doctors involved in this practice. It must be added, in fairness to the Chiefs of these institutions, that such procedures are stamped out as far as possible, when they become aware of it.

The Roentgenologist as an Expert Witness

OR THE Expert Witness as a Roentgenologist: It has occurred to the writer that it would be a very healthy procedure to present before the Chicago Roentgen Ray Society, x-ray films, exhibits in a given suit, along with the plaintiff's medical expert's report and his testimony in court, together with the defendant's reports and testimony. The members of the Chicago Roentgen Ray Society could then decide whether the roentgenologist is an "expert witness" or whether the expert witness is a "roentgenologist." This forensic discussion might well be not limited to the pneumonokonioses.

Medicolegal

AS BEFORE pointed out, the problem of the pneumonokonioses in industry is limited in this article to the medical-legal phase of cases wherein suit has been filed against the employer and wherein there is neither silicosis nor other pneumonokonioses.

I have been closely associated with attorneys representing defendants in the examination and the medical preparation for defense in some 200 to 300 cases in which the claim was silicosis, pneumonokoniosis, tuberculosis and a general dragnet of any occupational disease which the plaintiff's attorney conceived could be remediable under the old and antiquated occupational disease act of Illinois. I venture to say that in an examination by the x-ray, and in some cases followed up by work history and physical examination, less than 1% of these 200 or more suits disclosed any basis for a claim for silicosis or other pneumonokoniosis as the result of exposure to harmful dusts. I have followed up the trial and defense of a number of these cases, one of which went to the Supreme Court of Illinois, in which the plaintiff's proof by x-ray showed not the slightest trace of either silicosis, pneumonokoniosis or any lung injury resulting from the inhalation of harmful dusts. Despite this fact the verdict of the jury was for $20,000 and the employer was forced, upon the face of the record showing no disability but an absolutely normal lung, to spend several thousand dollars in finally reversing the verdict of the jury and rulings of the court and convincing the Supreme Court that Section 1 of the Occupational Disease Act as now on the statute books was unconstitutional.

There are pending in the courts of Illinois literally thousands of cases based upon Section 1 of the Occupational Disease Act, the paper value of which, measured by the *ad damnum* in the complaint, will amount to at least $100,000,000. These cases must be defended by the employer, regardless of the merits or demerits of the claim.

Until 1933 the employers of Illinois were not confronted with any serious claim of injury to the human lung by the inhalation of harmful dusts. From 1933 down to the present date, the mass litigation above mentioned has developed against the employers of Illinois, and 90% of this

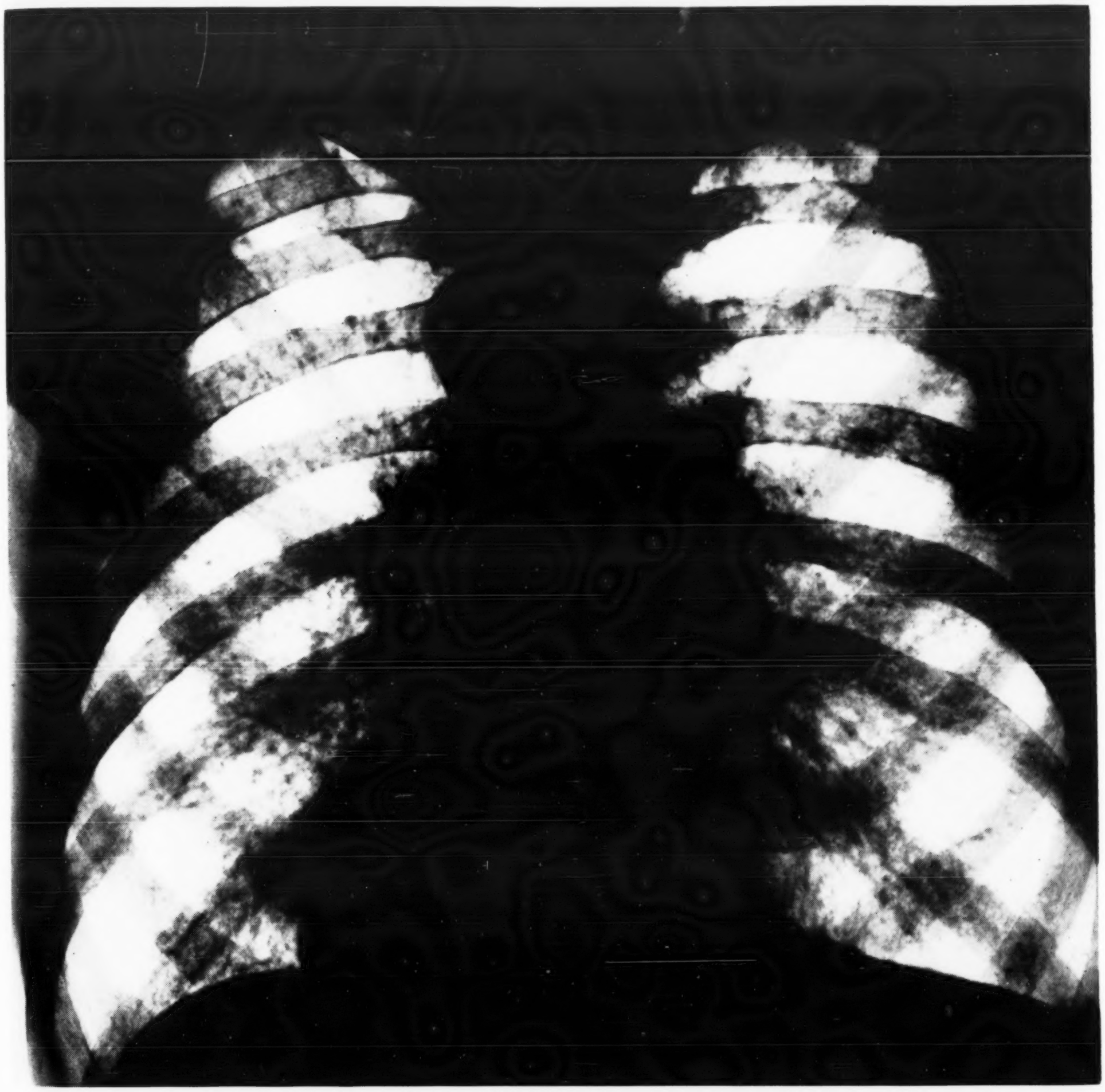

Fig. 13. This case shows a type of infiltration that is exactly like silicosis in every respect, and not even the experienced roentgenologist can distinguish. It has been produced by a CANCER of the esophagus. The mode of spread of some cancers follows exactly the same scheme as silicosis, and it is only by the patient's history that we are able to distinguish the difference between the two conditions

litigation has been conducted by a small coterie of attorneys representing the plaintiff, based upon a so-called "x-ray diagnosis" of either silicosis, pneumonokoniosis or tuberculosis.

There are on the statute books of Illinois several antiquated laws originally enacted to protect employees of this state from harmful conditions resulting from the inherent nature of their employment. Among such laws are the so-called: Garment Law; Blower Law; Health, Safety and Comfort Law; Occupational Disease Law, and the Basement Blower Law, all of which more or less have reference to employments in which there are poisonous fumes, gases or dusts in harmful quantities. These laws were enacted long before the question of silicosis or asbestosis, or the generic term of pneumonokoniosis, became acute in this state. In compliance therewith, the employers attempted to install such dust-preventing devices as the statutes comtemplated.

During the depression a small percentage of the legal fraternity, with the aid of a small percentage of the medical fraternity, conceived the idea of bringing suits; and wherever a man previously employed in any industry had suffered tuberculosis, an attempt was made through these various archaic statutes to trace the tuberculosis through the inhalation of poisonous or harmful fumes, dusts and gases in the employment in which he worked. The ball once having been started, there were literally hundreds of cases filed against employers where the man had been laid off from his regular work owing to the depression, in which an x-ray examination of the lung showed

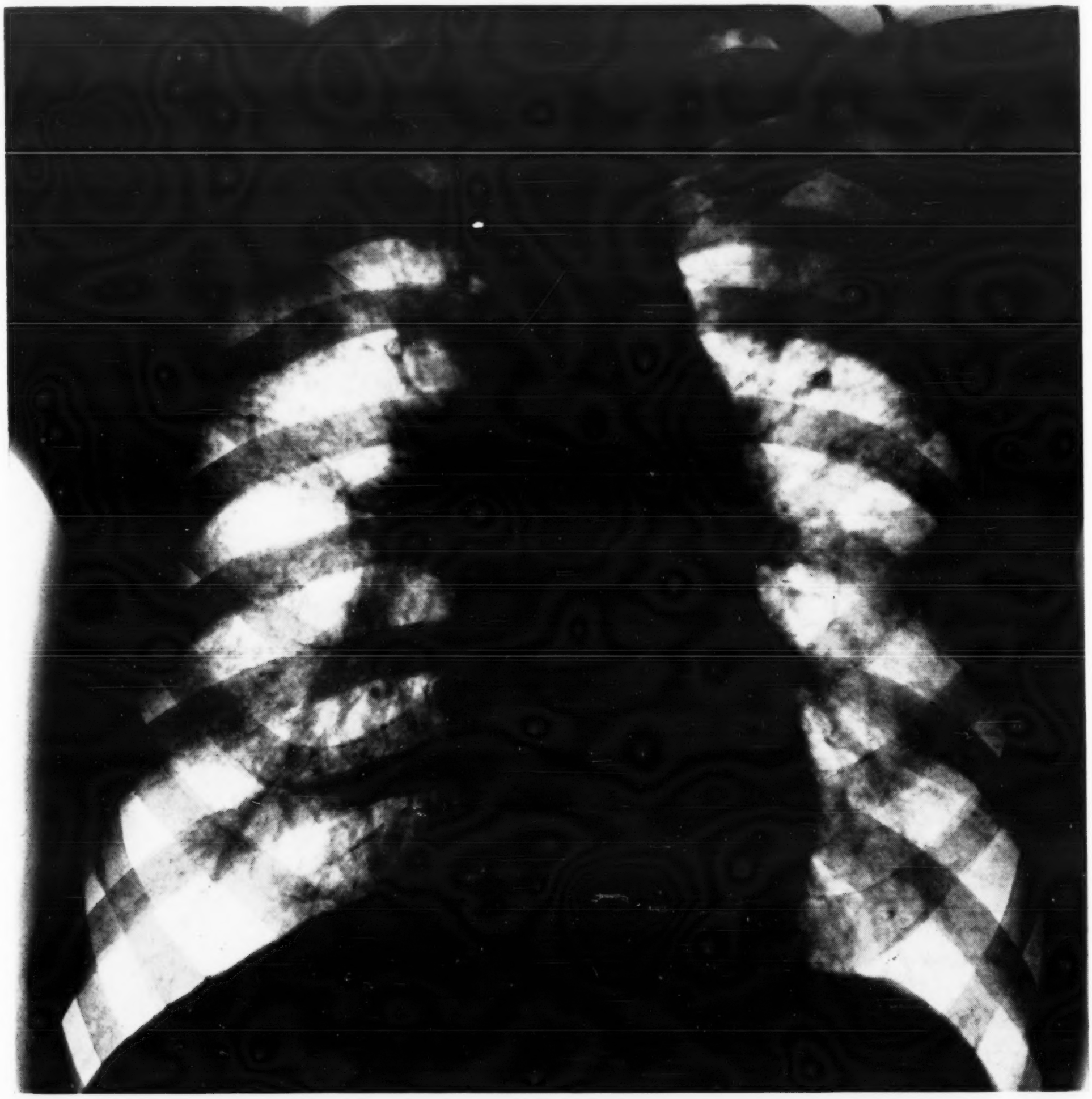

Fig. 14. This is a case of combined tuberculosis and silicosis. Note the density in the apices of the lungs which is the typical area for tuberculosis. The remainder of the lung fields shows this reticular network of silicosis. The question always arises whether the tuberculosis preceded the silicosis, or vice versa. This cannot be determined, yet we do feel that a lung affected by silicosis is more apt to get tuberculosis than one which is free. The reverse is probably not true, yet one would not hire a man with tuberculosis since he can easily prove to a jury that he obtained the disease while in your employ

a perfectly normal chest or a chest within the normal range of variation for a man of his age.

CONFRONTED with this problem, industry in Illinois realized that it was unjustly attacked, and that in 90% of the cases there had been no intentional violation of any of these archaic laws on the part of the employer. And until 1932-33 the employer had never heard of any claims of such character on the part of the employees.

The employers of Illinois, be it said to their credit, have made an honest effort, both through the legal and medical professions, to clear up this muddled situation. Their problem was limited to an honest medical opinion as to whether or not their employees had or were subjected to such diseases as complained of in numerous suits based upon the honest opinion of their legal advisers as to how they could best meet the situation both from the medical and legal point of view. They depended upon an honest opinion from their doctor and from their lawyer. A great majority of the employers have found out that there is no dust hazard in their employment, and that suits filed against them are unfounded in point of merit or fact. Some of the employers have found out that there were substantial dust hazards in their employment of which they had not heretofore

Fig. 15. Passive congestion of the lungs from decompensated heart. This pictures the lung mottling resulting from a passive congestion of the lungs as the result of a decompensated heart. This is a condition which must be noted in differential diagnosis of silicosis

been advised, and have made an honest effort to correct the same and do justice to their employees.

As a result of this situation, there has been for the last eight months a very concentrated, honest endeavor between employers and employees of Illinois, represented by their various officials, to arrive at an honest solution of the problem of the pneumokonioses in industry. The employers of Illinois have spent thousands of dollars in an earnest effort to analyze the dust hazards, if any, which exist in their plants, and to determine the best known methods of eliminating such hazards. In this they have been backed to the fullest extent by the authorized representatives of employees of this state. The result of these months of toil and expense has been a proposal to repeal the present antiquated and unconstitutional statutes now on the books of Illinois, and in their stead to enact the most modern and approved legislation that has yet been attempted in this or any other country.

To this end there has been an agreed bill for a comprehensive occupational disease law in this state, covering all diseases which arise out of and during the course of an employment and are medically and scientifically known to be peculiar and incidental to that employment.

There has been an agreed bill repealing the old Health, Safety and Comfort Act of Illinois, and (to meet constitutional objections against the present act by the Supreme Court of Illinois) conferring upon the Industrial Commission of Illinois the power to make reasonable rules re-

lating to the health and safety of employees in this state, with adequate protection to both employer and employee upon the reasonableness of the rules through an appeal from the decision of the Industrial Commission and to the Circuit and Supreme Courts of Illinois.

In Illinois there has been proposed what is known as a new Blowers Act, at the expense of thousands of dollars to the employer and based upon the latest scientific and engineering research for the elimination of dusts, poisonous and noxious gases in industry, which bill, if passed, will go into effect immediately upon its passage and remain in effect until July 1, 1937. By that date the Industrial Commission will have had time to make reasonable rules for the safeguarding of employees. Both employers and employees of this state will lend every assistance to the Commission in making these rules.

Here then is, in my opinion, a superlative effort on behalf of the employers and employees of this state, to solve the problem of the pneumonokonioses in industry. I think they have solved it as far as human intelligence can solve anything. They must, of course, in the last analysis depend upon the honesty of the Bar and the Medical profession of Illinois. Therefore, it seems to me, with this magnificent effort on behalf of employers and employees of Illinois to solve their own problem, its ultimate salvation depends upon the honesty and integrity of the Bar and the Medical profession of this state.

It is, therefore, the duty of the Bar of this state to eliminate as far as possible the ambulance chasing and quack lawyer. It is the corresponding duty of the Medical profession of this state to eliminate the ambulance chasing and quack doctor. If both the Bar and Medical profession of Illinois will perform these duties, I submit the problem of the pneumonokonioses in the industry of Illinois, in view of the efforts of the employers and employees above mentioned, can and will be solved to the benefit of all.

Discussion:

DR. DAVIS C. STRAUS, Chicago: I feel that Dr. Davis has given much information that is extremely instructive to us as physicians. It is revealing to find that, in the 30 cases he analyzed, one physician was acting as the expert witness in 17, or more than half, of the cases and that he feels that this witness's testimony was incorrect in every instance.

In 1933 I was appointed Chairman of a Committee of the Institute of Medicine of Chicago to investigate how our Illinois Workmen's Compensation Laws are working out. It has been a difficult task and little, so far, has been accomplished. A presentation such as you just listened to is valuable in pointing out where much of the trouble lies. It is in the quality of the so-called expert witness. I recently discussed this aspect of the subject with Dr. William Darrach, a prominent New York surgeon, and he informed me that in his state they have attempted to improve the type of expert testimony by having a Committee of five members of their State Medical Society attend every hearing. This, he says, has been of great value.

It seems timely, from what Dr. Davis has said, that we in Illinois do something actively and constructively to improve the quality of medical expert testimony in our state. It might be well to formulate a law making it obligatory, in all cases in which x-ray films and evidence are presented in court, to send the x-ray exhibits to the Chicago Roentgen Ray Society, giving the plaintiff's report and testimony and the defendant's report and testimony, for review by the Society. This would give the Society an opportunity of knowing who in and out of the Society are competent to act as expert witnesses on the interpretation of Roentgen findings—not only in the pneumonokonioses, but also in other conditions, such as bone lesions, etc., and the Society could so recommend them to the Industrial Board and the common law courts. Any Roentgenologist or physician whose interpretations are repeatedly found to be erroneous should not be able to qualify as an expert on Roentgenological findings and their significance. This would probably have much the same protective value for the good name and standing of the Medical profession at large as the New York plan, and, I believe, would be superior to it. Similar practice might well be adopted generally throughout the country, submitting the evidence to the nearest local qualified Roentgen Ray Society, working in conjunction with representatives from the local, state, and the specialistic societies.

For us here in Illinois I believe it would be of economic value and to the interests of the Medical profession, and I would like to suggest it here tonight: that the Chicago Medical Society, the Chicago Roentgen Ray Society, the Central States Society of Industrial Medicine and Surgery, the Institute of Traumatic Surgery, and all the specialistic societies, each appoint a Committee similar to the one initiated by the Institute of Medicine of Chicago, to work along with it, and that all actively work to make constructive suggestions as they find them to be needed in the formulation and working out of our Workmen's Compensation Laws for the prevention and compensation of these cases.

I believe it would be highly desirable to have the Chicago Bar Association appoint a similar Committee, and that this group and the medical group at joint meetings could be mutually helpful, and accomplish some real advances in medicolegal justice and social science.

New Treatment of Sprains

KRAUSS mentions the various therapeutic methods employed in sprains,* and shows that the best results are usually obtained in persons who have received no particular treatment but who had the energy to disregard the pain and at once begin with the active exercise of the joint. He points out that among actors it is customary to apply alcohol to a sprained joint and hold it over steam. This stops the pain and makes movement possible. He followed this suggestion and found that the application of ethyl chloride produces anesthesia of the articular ligaments and that active movements during this anesthesia counteract the stiffness of the joint. He describes the procedure he usually follows. After the diagnosis and roentgenoscopy, he determines the painful joint and applies ethyl chloride to it. Freedom from pain is soon established, and is protracted by dropping a mixture of ether-alcohol-acetone (100 parts each) and camphor (20 parts) on the joint. Then the patient is urged to make active movements, chiefly in the direction of the greatest functional impairment, which of course has to be determined before anesthesia is induced. The treatment is continued for from 10 to 20 minutes and is repeated several times. The patient is urged to apply at home, three times daily, the alcohol and steam treatment and to do further exercises. The author recommends the treatment for all new sprains that come under the physician's care in the first week or two following the accident, and for old relapsing sprains. The treatment is contra-indicated in cases in which the articular ligaments are severely torn, or when an intra-articular exudate is present. He warns against excessive freezing with ethyl chloride. Then he reports several cases in which he employed the treatment. He thinks that the method may eventually prove helpful in the after-treatment of fractures, as well as for diagnostic purposes and for painless reduction of incarcerated menisci.

* *Wien. klin. Wchnschr.* 48:1014 (August 9, 1935); Abstr. *J.A.M.A.*, September 28, 1935.

The Institute of Traumatic Surgery

—Abstracts of Proceedings of the Institute of Traumatic Surgery and the Chicago Orthopedic Society, March 13, 1936—

THE Institute of Traumatic Surgery held an all-day clinic meeting at St. Luke's Hospital, Chicago, Friday, March 13, 1936, when the following program was presented:

MORNING SESSION:

DR. L. P. KUHN: "Compound Fractures of the Skull."

DR. F. P. HAMMOND: "Comminuted Fractures of the Skull."

DR. GEO. L. APFELBACH: "Ankle Fractures."

DR. ROBERT O. RITTER: "Old Ununited Fracture of the Leg."

DR. E. C. HOLMBLAD: "The Use of Pooled Convalescent Serum in Cases of Hemolytic Streptococcus Infections."

DR. FREMONT A. CHANDLER: "Infarction of the Head of the Femur."

DR. FREDERICK W. SLOBE: "Observations on Injection Treatment of Hernia."

DR. JOHN D. ELLIS: "New Method for Localization of Foreign Bodies."

DR. SYDNEY WALKER: "Series of Traumatic Eye Injuries."

A motion picture film relating to popular information concerning the eye was also displayed.

AFTERNOON SESSION: This, beginning at 1:30 p.m., consisted of demonstration of apparatus, lantern slides, and motion pictures by Dr. Roger Anderson of Seattle, on the subject "Ambulatory Method of Treating Fractures of the Shaft of the Femur and Functional Method of Treating Fractures of the Shaft of the Humerus."

At 6:30 p.m. there was a joint dinner with the Chicago Orthopedic Society at the Palmer House, in honor of Dr. Roger Anderson, guest speaker, and also in honor of Dr. Henry Meyerding, guest speaker of the Chicago Orthopedic Society.

The evening meeting was given by the Chicago Orthopedic Society, and consisted of papers by the speakers as noted:

"Fracture of the Neck of the Femur: A Mechanical Problem: The Pauwell Method of Treatment," by Dr. Ferdinand Seidler.

"Fractures of the Patella," (motion pictures) by Dr. J. J. Callahan.

"Dupuytren's Contracture," (with lantern slides and motion pictures), Dr. Henry Meyerding, of the Mayo Clinic, Rochester, Minn.

Morning Session

DR. L. P. KUHN demonstrated a case of a man, aged 52, who entered the hospital in shock, with a deep cut on his left cheek, a deep fracture of the frontal bone on the left. The x-ray demonstrated that the deep compressed fracture of the frontal bone on the left side was continued through the left orbit and also that there were fractures of the eighth and ninth ribs. Arrangements were made to do a decompression. Caffeine sodium benzoate was administered for shock. No debridement was done, only external cleansing. During the first 48 hours, rest was the chief therapy. On the second day the reflexes were normal and the pupils were likewise normal. The pulse continued slow until the second day. Glucose solution was given intravenously. Surgical interference was delayed until the third day because of no real indication for it. The patient then suddenly developed pneumonia and it was necessary to wait until the twelfth day until the temperature was normal. The fracture was decompressed at that time. At operation it was discovered that there was a comminuted depressed fracture about the size of a dollar, that the dura was punctured in several places. Subsequent x-ray films show filling in. The patient has man an uneventful recovery. The unusual point about this case is the waiting period of approximately 15 days before decompression was attempted, and this illustrates an important point to keep in mind in head cases. In the discussion, the essayist stated that he would not ordinarily use spinal puncture if pressure had been present, that he would use glucose and cathartics.

DR. FRANK P. HAMMOND presented several cases of comminuted fracture of the elbow. In one instance, the boy fell from a moving truck. A preliminary diagnosis was made of fracture of the head of the radius and a chip off the external condyle of the humerus on the left, and a chipping of the right external condyle. This was confirmed by x-ray photographs. The patient was put up in double hyperflexion and supination, moulding the cast. The amount of limited range of motion was from 10 to 15% originally but has now been reduced to 5%, according to a recent decision.

The second case presented by Dr. Hammond was that of a female, aged 68, who fell in the street. The diagnosis was a supra-condylar fracture of the humerus in which the upper fragment had punctured the skin. This patient was put up in double suspension traction and later in a Magnuson triangular splint, after which the elbow could be moved. The case was in the hospital for two weeks.

The third case presented by Dr. Hammond was that of a fracture of the lower third of the humerus with a shattering of the ulna. The case was put up in double suspension traction and the fragments moulded into position. Motion was started the second day. An original rating of 45% was given, but that is probably less at the present time.

DR. JOHN G. FROST, in presenting a case which he stated was not as severe as those presented by Dr. Hammond, emphasized that the important point is to maintain good functional blood supply and muscular tone. The case presented had a dislocation of both bones of the forearm and a fracture of the olecranon. There was much extravasation of blood and considerable comminution. By the end of 48 hours after the injury the dislocation had been reduced following Murphy's dictum to reduce the dislocation and to disregard the fracture. Fourteen days later an

open reduction was done, which was 45 days ago. Good pronation and supination was obtained. In considering these cases, a manipulation of the parts is important. In this case the patient did not have a bandage on for more than four days at a time, and usually not more than three. Dr. Frost believes that flexion should be done to the point of objection. An important consideration is to try to get the circulation normally established, and in doing this the essayist did not believe in the use of lights and other means. An angular aluminum splint was used in this instance because this would permit of motion and freedom. In this case two towel clips were used for holders, and No. 2 chromic catgut was used for bringing the olecranon head into approximation.

DR. E. C. HOLMBLAD demonstrated the charts of two patients on which a pooled convalescent serum was used because of hemolytic streptococcus infection. One encounters virulent infections occasionally, in spite of all precautions. After culturing, one finds streptococcus and then there is great concern. Two such cases occurred in this series and the observations may be of value. One would not go so far as to make the recommendation that pooled serum should be used in all instances, but the cases should be selective. In these instances severe systemic infection had occurred, the patients were apparently ready to pass on, and the relatives had been notified. Today both of these patients are alive and walking about because of the use of the serum. It is understood that this serum is to be used as a last resort. Reference was made to the work of Thalheimer and others.* The theory of the use of the serum is that there are many variations in different strains of hemolytic streptococci. A number of important points should be emphasized about this pooled serum: (1) this is an all-human serum (this has a great deal to do with the avoidance of anaphylaxis—the nearest to such reaction being in this series a drop in temperature); (2) whole blood is taken from convalescent patients recovering from scarlet fever, in which the defense mechanism has been augmented; (3) about 250 c.c. of blood will produce 125 c.c. of serum; (4) blood is taken from a number of patients and pooled because of the slight difference in strains —usually not less than 25 different persons are used and more commonly, 30; (5) the serum is put up in 20 c.c. sterile ampoules convenient to use; (6) serum is given intravenously. In the first case, a female of 65, the temperature went up to 104. This woman was a cook, had previously had varicose veins for which she rubbed on liniment and wrapped up the leg. Blisters occurred and lumps were noticed in the right groin. The appearance of the skin was that of infected blisters. The patient was immediately put to bed and hot fomentations administered. The case did not look like erysipelas. The patient was given 10 c.c. of erysipelas antitoxin on each of three days successively, after which she became more toxic. Apparently the infection was not localizing. Several days later 100 c.c. of convalescence scarlet fever serum were given, and later 100 c.c. more administered. After this the patient developed an abscess which was properly drained. There was some febrile reaction, and before complete recovery the patient was given two more doses of serum. In the second case the patient had had an appendectomy in 1920 and had had three drainage tubes inserted. From this there resulted an incisional hernia. Two weeks before presenting himself, the patient had had acute abdominal colic. A reduction of the hernial mass was done in the office. Subsequently the patient was operated for an incarerated hernia and was home in about 10 days, but became very ill, the temperature going up to between 104 and 105. The appearance of the wound was not sufficient to account for the reaction, and it was also discovered that there was a sore throat. Smears were made showing hemolytic streptococci. The patient was given two doses of 100 c.c. of the serum all told. Convalescence was uneventful. In another instance, a similar case followed a mastoid infection. It is well to remember that this method of treatment cannot be applied to all cases. What is accomplished is giving the patient a passive immunity, a crutch as it were, to help carry him over. In the discussion it was brought out that it takes about 15 to 20 minutes to administer the 100 c.c. of serum, and that it can be obtained through the serum center at Michael Reese hospital. The serum is not diluted, but given full strength intravenously.

* As reported in *J.A.M.A.*, September 7, and September 14, 1935.

DR. GEORGE L. APFELBACH, in discussing ankle fractures, said that the most intelligent work on ankle fractures was done before the advent of x-ray diagnosis and that since that time little thought had been given to the consideration of ankle fractures. The essayist now has prepared 438 cases of ankle fractures that have been written up in a paper which is now ready for publication. In recent conversation with an anatomist some new ideas have been developed. It is now the feeling that diastasis is more common than has been stated in the texts and that, further, diastasis in regard to the tibia and fibula is a common cause of disability and frequently overlooked. X-ray films may be used to demonstrate the range of movements in the ankle. If one looks for points of tenderness, one can find such a point about the anterior inferior tibio-fibular ligaments, and from recent experiences in analysis of cases it is believed that this ligament is the first to tear. Other ligaments also tear and produce a greater diastasis. In such instances it is well to take several anterior-posterior views. The mechanism of fractures about the ankle is not really well understood by a great many observers; it is reasonable to believe that in every instance the foot is turned in and finally a Potts fracture occurs. We can see then that some classifications are incomplete in respect to the mechanism of such fractures. Postmarginal injuries are almost always complications of other fractures, and alone are quite rare. X-rays were shown of cases of Dr. Duff, reduced by traction. Another case demonstrated was operated this morning. Previously the usual reduction had been made and it was found in position but when the cast was removed, deformity presented. The chief difficulty is checking up on such cases, because they cannot be maintained in proper position for any period of time in a cast. Therefore, frequent checking with the x-ray is necessary, and finally putting them up in extension. In the case operated this morning a sequestrum was removed and later an arthrodesis will be done.

DR. FREDERICK W. SLOBE discussed the injection treatment of hernia, making the statement that such work has been attempted for the last hundred years, but it is only within the past five years that a modern technique has been developed. Since seeing Dr. Bratrud, of the University of Minnesota, about two and a half years ago, the essayist has been injecting more hernias than operating them. It is thought that this is a very live subject and that it is becoming livelier. There have been some unfortunate published discussions on the subject and some answers to queries which are somewhat weird. It is thought that we should become adequately informed on the question. The method of injection should be classed always as an alternative method and not as a competitive method with surgery. The biggest advance has been made recently from the use of strong, caustic, sclerosing solutions to the use of milder solutions which do not produce such difficulties as formerly. If proper solutions, such as are now available, be used there should be no fear of difficulty, since these have been used experimentally in the injection of bursae, in the eradication of varicose veins, and experimentally in animals in the intraperitoneal injections. One can eliminate the possibility of intravenous injection accidentally by withdrawing the plunger, and if one is in solid tissue it will immediately bounce back. There has been no necrosis in the experience of the use of the newer solutions. The patient should be followed every two years. One important item is the reduction of the amount of fat on patients before and during treatment. A truss should be worn in conjunction with the treatment for a period of six months at least in laborers, and it is better used longer than in former experience—in some instances a truss should be worn night and day for one month. The statistics of recurrence are probably not accurate. Most recurrences take place in one and a half to two years. In surgery, the recurrence is quite variable, ranging from 1% to 20%. In injections, it is thought that the stated percentage of recurrence should be higher because of inability to follow up cases. The essayist has had a recurrence of about 15%, and probably over a period of time this would vary from 10 to 20%. Dr. Slobe calls any slight bulging a recurrence. Regarding limitations of the injection method it is certainly best used in small and medium-size direct and indirect inguinal hernias. It has less application to femoral hernias and still less to umbilical hernias. It is contraindicated in sliding hernias and in cases of undescended testicle. Dr. Slobe now has under treatment a patient who has had three recurrences after surgery. It can be stated that complications are rare and unusual with the newer solutions and proper technique. The advantages of the method are that the patient can be kept ambulant, the mortality is nil, and the economic factors are more favorable. One must finally decide on the merits of each case as to which method is applicable.

In the discussion of Dr. Slobe's paper: Dr. Frost said he had become interested in this method and had done considerable experimental work on animals. He believes that the method is not without danger, and has found in experimental work that intestinal perforations were produced. Good results, however, have been obtained and he thinks that injection of 3 c.c. per dose is sufficient. One observation is that patients improve in weight under this treatment.

Dr. DeMotte has had experience in applying this method in recurrent hernias, and believes that it is of value when the break is found early. In his experience the injection of four to five doses will suffice. In later experience he has found that fewer injections will be sufficient, especially in using the newer solutions, the dosage being from 2 c.c. to 3 c.c.

Dr. Pontious has been able to observe cases which were first injected and then operated. In no instance did he observe irritation of the serosal surface. In this experience he has come to conclude that the sac is not entirely obliterated by injection methods. After two years' experience the recurrent rate he believes is quite high, probably over 20%. One case in his series was injected over 100 times and finally came to operation. This case showed much adherence of the various structures and a wall of fibrous tissue external to the sac.

DR. FREMONT CHANDLER, in discussing the subject of "Infarction of the Head of the Femur," showed lantern slides to illustrate the circulation of the head of the femur, namely through the nutrient vessel, through the capsular arteries, and the ligamentum teres. Very beautiful injected preparation was also shown of the circulation of the head of the femur. The patient of the case history presented had severe pain of the hip in January, 1932, without any trauma. When he was up and about, the pain varied according to the amount of activity. The x-ray film showed a sclerotic area of the head of the femur and an infarct was suspected. The patient was examined for evidence of thrombosis and also evidence of embolism, but no such evidence was found. At the operation, the head of the femur was resected according to a modified Whitman operation. The specimen of the head showed that the ligamentum teres tore easily. The head could be depressed, although the cartilage seemed normal. The underside of the specimen showed necrosis. The ligamentum teres was large, cystic, and was reddish blue in color—split longitudinally and contained no fibrous elements. A pathological cross-section of the head of the femur showed dead bone and cellulous debris filling some of the spaces, as well as new bone repair taking place. A pathological cross-section of the ligamentum teres showed very few blood vessels, of which the walls were thickened, being similar to the findings in a local Burguers disease. The patient was demonstrated and it was shown that the incision was that of a modified Smith-Peterson operation which gave a relative avascular field. The incision was modified to give a wider access to the joint. The patient demonstrated all movements without limitation.

DR. ROBERT O. RITTER, on the subject of "Old Ununited Fracture of the Leg," presented a case of a boy of 21 who in 1921 had injured his leg in a motorcycle accident. It was a compound fracture of the right leg which one year later showed non-union of the tibia in the lower third. An inlay graft was done, which was very snug fitting. This healed, and two weeks later it opened spontaneously. An x-ray of this first graft

was shown. Subsequently another graft was done, this time fastened with bone pegs. It softened, and in 1932 the second graft was removed. The patient was able to go on working until 1935, when he came in the last time with much bowing of both bones. At this time the fibula from the other leg was inlaid into the injured leg and the patient progressed very well for a period of two weeks, then the skin parted and drainage began. Absorption was apparent in the x-rays taken at this time. It was also discovered that a sequestrum was present. The patient had made a number of drawings and decided that he would prefer amputation. However, it was decided that he should be given one more chance. One month ago the fibula was removed. Subsequently the patient had temperature. The wound was left open and packed with vaseline gauze and now appears to be healing.

DR. JOHN D. ELLIS presented the subject of "New Method of Localization for Foreign Bodies." In this kind of work experience is the only thing that can confer skill, but the layman appears to think that one operation is sufficient in locating foreign bodies. The sugeon should be provided in the first place with the proper type of apparatus to do this work. It has been found that the use of iodized oil plus a dye will permit of x-ray localization and operation following localization. The essayist first used methylene blue in iodized oil, and also subsequently adapted the use of right-angular wire screens for localization. Preliminary films are taken for localization, the sterile screen is applied, with the distance of the x-ray tube at one meter or more. The simplest localization can be accomplished by counting the interstices of the screen. Drops of colored oil may be introduced where the body is expected. This method is less hazardous than the use of skewers or needles. Dr. Ellis prefers general anesthesia, since complete relaxation of the musculature is important. There is great difficulty in the removal of foreign bodies from the hip because of the loose muscular tissue. The axilla is another region where removal is also difficult. If no soluble dyes are available, the physician may use a mixture of Karo and methylene blue. In the discussion, the question was asked about the localization of wood splinters. The method applies only to opaque bodies but the splinter sinus may be injected with bismuth paste.

DR. SIDNEY WALKER presented a group of cases showing traumatic eye injuries. In one patient a piece of wood had struck the right eye and it was necessary to do an iredectomy. Later on a traumatic cataract developed, and also a secondary glaucoma. The lens was extracted. Several other cases of injury to the eye were demonstrated, with comments on operative and postoperative procedures. As a conclusion to his presentation, Dr. Walker showed a motion picture film demonstrating popular ideas relative to the proper fields of endeavor of the oculist and the optometrist.

Afternoon Session

THE afternoon session was devoted entirely to a presentation of Dr. Roger Anderson, of Seattle, relative to the "Ambulatory Method of Treating Fractures of the Shaft of the Femur and Functional Method of Treating Fractures of the Shaft of the Humerus." The presentation was illustrated with lantern slides and motion pictures.

In fractures of the lower extremity, a skeletal traction is sufficient, reduction is accomplished. In fractures of the tibia and femur, traction is no better than counter-traction. Pins can be used as handles for manipulation, since you have handles on each fragment. By the use of casts one can fix the parts.

Lantern slides were shown of a spiral fracture in which the patient was up and about after the plaster had hardened. The points of pin insertion were illustrated. It is the custom of Dr. Anderson to clean the skin with soap and water, using ether and then ¼ strength iodine.

The places for pin insertion are two fingers above the internal malleolus, the other location being near the patellar ligament insertion laterally. An apparatus is used for inserting the pins or, if one is sufficiently strong, the apparatus may be dispensed with. After the plaster sets, the pins are covered and the patient can leave the hospital.

A little overlapping of the fragments is quite proper, and is not as bad as some separation. Even if some angulation occurs after callus formation, this is favorable.

Examination is done under the fluoroscope before the plaster is applied. No manipulation is done under the fluoroscope because of the possibility of burning the patient. After the first examination under the fluoroscope, the fluoroscope is removed and the manipulation is done and then a check is made with the fluoroscope. If necessary, this series of events can be kept going until proper alignment is accomplished.

In applying the cast, adaptation may be made so that wounds of the soft parts may be properly treated.

In compound fractures of both bones of the legs, it is possible to manipulate the central part by use of the so-called "hat-pin" apparatus.

In fractures of the patella, transfixion is done with wires above and below, plaster is applied, and the patient may then be able to walk.

The so-called "well-leg" splint has not been found so helpful for persons who are expected to be ambulatory, but has secured fair results in older persons.

In fractures of the shaft of the femur, the cast is usually applied from the knee to the hip. Two Steinmann pins are applied at angles held by the vertical bar as demonstrated. By this method, reduction and fixation are accomplished with no pain and no great amount of after care. The upper pin is passed through about the center of the greater trochanter, and the other pin through the shaft below. Wires or pins are then passed through the supra-condylar portion, and then another wire almost through the condyles. The anatomical splint is then used. One can then move the upper fragment anatomically is necessary.

A number of slides of cases of malunion were explained.

It is sometimes necessary in children or non-cooperative patients to run the cast to the chest to prevent scratching of the skin around the areas in which the pins are inserted.

In fractures of both femurs it is advisable to

reduce one at a time, using the same technique. In fractures of the femur and the tibia the same technique is used, reducing the femur first. The technique can also be used in fractures of the pelvis. Compound fractures are also amenable to this method. It is likewise found that pathological fractures, for example in luetics, react favorably to this technique.

A motion picture was shown illustrating the various points, and here it was brought out among other points in the technique that the pin wounds are not dressed from time to time, but that the original dressing is kept on.

In the discussion it was developed that one difficulty is putting on too much traction originally. The general advantages of this method are the good results obtained, the absence of infection, and the reduction of hospital stays.

In the discussion:

DR. HOLMBLAD brought out the point that many advances are made by people who are courageous and who may at first be skeptical as to the wisdom of present methods. The real advance in this method is the possibility of reduction in the first few hours after the fracture takes place. The surgeon needs a real fracture sense. It is impossible to make a good surgeon merely by supplying apparatus.

DR. VALENTINE preferred the two-legged splint for holding good position in certain types of fractures. It is felt that the public must be educated to the use of pins, and also that physicians and surgeons must learn the adaptation of these methods.

DR. LEWIN brought out that the splint is no more dangerous than the man who uses it—in other words, the splint is as good as the "splinter." The same can be said for the apparatus which has been demonstrated here.

DR. ANDERSON, in replying to some of the discussion, said that it was necessary to avoid hurry. It is an important point to evert the foot. One must either use very little padding or none. In regard to stiff knees, a cutout can be made in the cast over the knees and the patella should be moved regularly. The patient may also sit on the edge of the bed and move the knee joints, thus getting relaxation of these joints. In the avoidance of infection it is necessary to keep in mind that one should not touch the skin; the skin should be very well cleaned and, furthermore, the pins must not move after they are once set. If the cast is properly applied and subsequent care of the cast is taken, the pins should remain unmoved. Dr. Anderson prefers morphine or scopolamine, and sometimes 2% novocain.

DR. WILLIAM CUBBINS, in further discussion, questioned the covering of pins for an indefinite period. He believed that where the skin had been insulted by injury a great deal of care must be taken, and that this will vary in different cases.

Several requests from the floor resulted in Dr. Roger Anderson showing lantern slides and motion pictures regarding the use of this special technique in the treatment of fractures of the forearm and arm.

In submitting material regarding the treatment of fractures of the bones of the forearm, after going over many textbooks and the use of many different methods, and after experience with malunions, with open operations, this method has been adapted to fractures of the forearm.

The points at which the pins are inserted are three fingers below the tip of the olecranon process and through the radius at a point two fingers above the wrist joint. Through these points traction and counter-traction may be secured.

Lantern slides were shown, both diagrammatic and x-ray, giving information concerning the use of this method.

A motion picture of the technique was also shown, giving the operative procedures.

The anesthetic of choice in this instance is gas. The pins are properly inserted. The anatomical splint is applied. Reduction is accomplished by proper manipulation if found necessary. The cast is applied and the patient then may become ambulatory. It has been found that most cases give the best results of reduction in the position of pronation.

Evening Session

THE Institute of Traumatic Surgery met with the Chicago Orthopedic Society in a combined meeting at the Palmer House, with the program as previously mentioned.

DR. FERDINAND SEIDLER presented material concerning fractures of the neck of the femur, using the figures from a monograph projected on the screen. A considerable number of figures were thus projected, especially giving information concerning stresses and strains in fractures of the neck of the femur and also containing corresponding x-ray photographs in these cases. One of the great difficulties in this work is the explanation of why bony union takes place in some instances and non-bony union in others. Especial emphasis was put on the Pauwell method of treatment of this type of fracture.

DR. J. J. CALLAHAN, in discussing fractures of the patella, showing pictures, based his conclusions on 549 cases of fractures of the patella ranging from five years to 81 years, the majority being between 35 to 50 years of age. Of these, 395 were transverse, of which 154 were comminuted. There were 10 compound fractures. Three hundred and sixty-one were operated upon, and 188 were treated conservatively.

The treatment was really of two types, consisting of capsular suture or conservative treatment. Surgery was about 80% efficient in this series. The technique consists of a straight incision, the cleaning of the lateral tear, the accomplishment of good bony contact, a silk purse string suture (extra articular) with proper repair of the quadriceps tendon and the patella tendon. Interrupted catgut was used on the capsule. The skin was closed with skin clips. The operation was done under the so-called Martin bandage.

DR. HENRY MEYERDING discussed Dupuytren's contracture, which was first published in 1832. The onset occurs with little or no pain in many instances. The material was presented on 448 hands and 273 patients, of which 141 showed focal infection, mainly tonsils and teeth. Trauma was the factor in 25% and infection was the factor in 3%. A motion picture was shown describing the technique of operation which consisted mainly of dissecting out the fibrous tissue, making sure to leave the tendons flexible and avoiding blood vessels and nerves.

DR. SUMNER KOCH, in this discussion, exhibited several cases of Dupuytren's contracture after operation, emphasizing the importance of sufficient

time, patience, and gentleness in the handling of the tissue.

Further discussion was given by Dr. Michael Mason and Dr. Roger Anderson, the latter emphasizing again the principles of traction and immobilization in the treatment of various types of fractures. Dr. Wm. Cubbins believed that the atrophy of thigh muscles was not all due to disuse, that the strength of these muscles was not altered, and that this was a problem on which further information must be secured. Dr. George Apfelbach discussed general principles and special technique regarding fractures of the neck of the femur.

Silicosis

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DEFINITION—"Silicosis is a disease due to breathing air containing silica (SiO_2), characterized anatomically by generalized fibrotic changes and the development of miliary nodulations in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis (some or all of which symptoms may be present), and by characteristic x-ray findings. . . . The disease is divided arbitrarily into first, second, and third stages for convenience of description and possible compensation purposes."[1]

Types—At least two distinct types of silicosis are recognized: acute and chronic.

(1) The Acute Form was reported as early as 1713, when a British patent for grinding flint by wet methods was granted because the dry powdered material "proved very destructive to mankind, so much that any person, ever so healthful, working in that business cannot possibly survive over two years."[2]

In 1875-76, Dr. B. F. Richardson[3] (England) described a typical case in a boy employed at making sandpaper, who began to cough the first day he worked, soon "developed signs of acute pulmonary disease, and died within the month." Here the diagnosis was proved by autopsy. The condition was also described by Sir Thomas Oliver in 1909[4] and further elaborated in 1916.[5] Some of Oliver's references are to the first extensive outbreak of acute silicosis. This occurred in the early years of the South African gold mine developments when dry drilling was the rule. A less severe occurrence was reported in rock drillers and excavators in New York City (1928).[6] The next extensive outbreak occurred in New Jersey in 1930-31.[7] Probably the most extensive outbreak occurred in connection with the Gauley Bridge tunnel in 1930-32.[8]

(2) Chronic Silicosis. — This is the form to which the definition above specifically relates. Chronic silicosis probably existed pre-historically in connection with making flint-pointed weapons and is said to be the oldest known occupational disease.[2] Lanza and Higgins made the first industrial investigation of silicosis in this country (1914). This was in the Joplin, Missouri, lead-zinc mines.[9] While silica (SiO_2) is the essential damaging factor, several sub-forms of the disease may be recognized: Silico-anthracosis, silico-siderosis, silicatosis (sericite, etc.), siliconosis (silica mixed with silicates), and asbestosis (which is really a silicatosis).

Occurrence.—Pneumoconiosis (lung - dust - disease) is a term covering all forms of dust disease of the lungs. The range of processes to which workers may be exposed was detailed in the Ohio Survey of Occupational Diseases and Industrial Health Hazards in 1915, where the workplaces of 235-894 wage-earners were investigated.[10] It was found that anthracosis was not a significant disease during the investigation of 99 coal mines in Illinois and Ohio in 1918.[11] The present number of workers endangered by silicosis dusts in American industries was suggested by Van Siclen in 1933 as about 400,000,[12] and, in 1934, by Lanza and Vane as about 500,000.[13] A most extensive coverage list of industries concerned is that prepared by Russell.[14]

Predisposing Causes. — Heffernan[15] maintains that silica is a normal constituent of the animal body, offering stiffening properties to tendons, scar-tissue, etc. Scarce at birth, its amount accumulates as age advances, and a normal, minute concentration is found in the blood stream, any excess being rapidly eliminated by the kidneys. When inhaled into the lungs, however, in excessive amounts, as may be the case when in very fine dust form, it brings about a blocking of the drainage system, then of finer air tubes and their terminals, the air cells. This is due to the slow formation of multiple, shot-like areas of scar-tissues (nodules or nodulations) which contain some of the silica itself, and varying amounts of pigment. It is disputed whether this action is chemical, due to slow solution of the silica, or is mechanical, due to the continued presence of a foreign body, as would occur in any other tissue of the body. It is now generally agreed that it is not due to any cutting properties of the crystalline matter itself—both physics and physiology being against such a contention. The piezo-electrical properties of quartz might explain the phenomenon as due to release of pressure as the grains undergo slow solution in the lung juices. When it is recalled that there are three isotopes of silicon and some eight stabilities as regards temperature ranges,[16] the possible range in biologic effects of this complex element becomes apparent.

While silicosis is apparently uncommon among desert dwellers, still, dust storms, producing pneumonia, proved a scourge to American soldiers when patrolling the Mexican Border in 1915-16. In the early stages, pneumonia is very common when there is over-exposure to silicious dust.[17] High altitudes increase the hazard (due to deeper breathing), likewise, dry climates and dry atmospheres. Those over middle age develop the disease more readily. Sex appears no factor. The matter of racial susceptibility is controversial.

The efficacy of the nose as a dust filter is probably the most important factor. I have seen a case develop to an extreme third stage, and early death, from an exposure of about two and a half years. This occurred in a worker at a silica quarry, who had a marked cleft-palate. Workers whose nasal dust fixation capacity lies below 30-40%, developed the disease readily, while only two of 31 stone-cutters, with better nasal retention capacity, showed the disease after a period of work of from 10 to 30 years.[18]

Two sources of silicious dust must be considered in any plant: (1) the local process, and (2) the

* In *Engineering Experiment Station News*, February, 1936.

general dust floating in the air. The most harmful dust is of the nature of two microns and less, and is buoyant. Hence, the estimation of the dust in the working atmosphere is important. This may be done quickly, but often accurately enough for practical purposes, by noting the amount of dust in a sunbeam or similar ray of light (Tyndall effect).[19] It can also be estimated by dust counters using proper precautions in sampling, etc. Estimation by weight of dust per unit volume of air is the method chiefly used abroad. The engineer wants exactness, while the physician, appreciating varying biological thresholds, adjustments and adaptations, is not much concerned about exactness. Given a reasonable evaluation of environmental hazards, the physician prefers to steer by watching functional disturbances.

I have seen dry dust in a tripoli mill which, because of apparent electrostatic properties, could not be dusted even though shovelfuls were thrown up into the air and viewed in a bright sunbeam. Naturally, moisture, or wetness will greatly limit dustiness.

Previous dusty occupations, for example, coal mining, undoubtedly, predispose workers who engaged later in silicious dust, due probably to a partial blocking of lung drainage channels by carbon dust. The irritating qualities of chemicals inhaled along with silicious dusts increase the hazard, as may occur in fertilizer works. Space does not permit a discussion of the amount of dust per unit volume of air necessary to be harmful, but it is a good general rule not to expect the body to tolerate much more of anything than customarily occurs in nature, and especially beyond the production of warning symptoms. All the more so when definite disease is known to follow in a given type of exposure. Obviously, the higher the percentage of silica in a mixed dust, the greater the risk. Whether the admixture of other dusts may mitigate the risk is still a controversial point.

Certain other very important factors predispose to silicosis: Hard laborious work, high temperatures, the presence of abnormal gases, or decreased oxygen—all necessitating deeper breathing; likewise, long hours and absence of holidays.

There is evidence that, assuming pneumonia is avoided in the early period of exposure, as short a time as two months in a bad exposure will cause permanent damage to the lungs, although the average for acute silicosis would appear to lie in the vicinity of about five to 10 months' exposure, while the chronic form, which is by far the commoner type, requires a usual exposure of from five to 20 years.

Silicosis is commonly regarded as the easiest of all occupational diseases to diagnose. For one thing, it practically never occurs except through industrial exposure. In x-ray pictures, the acute form shows early massive infiltration of the lung substance, with *soft* satellite nodules in the vicinity. The chronic form shows, in addition to a non-characteristic and moderate fibrosis, the appearance of *hard* nodules quite symmetrically located in both lungs; but, with continued exposure, the chronic form takes on conglomerations and gradually becomes massive. Secondary infections are likely to occur in both forms.

TUBERCULOSIS COMPLICATION. — Because of the x-ray picture and to some extent the pathological findings, this infection has been much too frequently diagnosed as tuberculosis, but more careful investigations, and particularly autopsy findings, have cast grave doubts on the question of whether silicosis predisposes to tuberculosis. Theoretically, the two diseases are antagonistic—tuberculosis being healed by a process of fibrosis which, of course, is the chief lesion in silicosis.

There is good reason to believe that silicosis has existed in a disabling degree where the chemist finds more than 1% of the dried lung ash to be composed of silica.[20] In this connection, the x-ray investigation of 919 sandstone quarrymen and dressers in Amherst, Ohio, district, by Hayhurst et al,[21] appears to have been the first to call attention to the possibility of silicosis with low incidence of tuberculosis. Soon afterwards (1928), the Picher Clinic,[22] in an examination of 7,722 workers, found 21.33% with silicosis, and but 3.46% with silicosis-plus-tuberculosis, and 1.34% with tuberculosis alone. The last triennial report from South Africa likewise substantiates these findings.[23] In a fine series of 21 x-ray films sent to me from South Africa in 1933, practically all lesions which would formerly have been called "tuberculosis" are now labelled "infective," leaving the question *open* as to the true nature of the infection.

CONTROL. — Three agencies enter into control — the engineer, the doctor, and the compensation bureau. Space permits discussion, and most briefly, of only the last named. Silicosis is now compensated in all English-speaking countries, also Germany, and various other European countries, but in only some eight states of the United States. Election of compensation methods by employers is, in the writer's opinion, the best protection against the silicosis "racket." Should the present Ohio Occupational Disease Compensation Law be declared unconstitutional (and several suits, including two in Federal court, are now pending), a lot of lawsuits may be expected to follow.

This raises the question as to how extensive silicosis may be in Ohio. It is impossible to answer this from the evidence at hand.[24] In the last two years, during which considerable agitation about this disease has been extant, only 54 cases of pneumoconiosis (the broad coverage term) in 1934, and 52 in 1935, were reported to the State Health Department, and of these, probably less than a dozen each year could pass muster as genuine cases before a competent silicosis board. I would risk an estimate that if silicosis were placed on the compensation schedule in Ohio, there might be filed in the first year upwards of 600 claims, most all of which would be old standing cases, and less than one-third of which would be eventually evaluated as silicosis. It should also be pointed out that most cases of silicosis discovered in routine examinations have no disability at the time and would, therefore, not be compensable under existing state laws, but English, South African, and Canadian schemes provide for compensation even here. Usually the lung effects of silica have about spent themselves by the end of two years after the last work exposure, and thereafter, unless the affliction is complicated by infection, or emphysema (ballooning or blebbing), it remains practically stationary.

Silicosis and most occupational diseases could be prevented if all employers dealing with dangerous substances or processes were required to provide periodic medical examination of employees, subject to check-up by duly constituted health authorities, as already provided in the so-called "lead

law," Section 6330-6-7, General Code of Ohio, referring to the manufacturing of certain lead compounds. This law was passed in 1913 and has resulted in the practical disappearance of reports of lead poisoning for the last 20 years in the industry covered, and appears to have worked no material hardship on any one concerned.

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Pneumoconiosis in Pittsburgh

A CAREFUL study of the protocols, histories, and sections of 2500 postmortem examinations has been made on materials furnished by the Singer Memorial Laboratory of the Allegheny General Hospital, the Mercy Hospital Laboratory, and the Pathological Department of the University of Pittsburgh.*

The purposes of the study were to discover if possible what dust diseases were common in Pittsburgh, and whether silica was present in an injurious amount, and to ascertain the relationships of dust deposits and tuberculosis, pneumonia, other pulmonary affections and heart disease.

The amounts of carbon seen in the sections of the lungs were used as a means of separating them into five grades. The criteria for grading were:

ARBITRARY CLASSIFICATION OF PNEUMOCONIOSIS IN LUNG:

I. Carbon pigment phagocytes in alveoli. Few in perivascular lymphatics.

II. Wide distribution of phagocytes—in all portions not averaging more than three rows of cells.

III. Widespread distribution of phagocytes of three or more rows of cells. Moderate compression of cells by fibrous tissue.

IV. Extensive distribution of phagocytes with fibrosis in peribronchial, perivascular and subpleural lymphatics.

V. Excessive fibrosis and pigmentation—puckering of pleura—perivascular—peribronchial—and intra-alveolar accumulations of phagocytes.

Of the 2499 lungs examined the table shows the degrees of anthracosis found and the age peak at which it occurred:

		Age Peak Years
Pigment free	179	Under 10
Grade I	289	Under 10
Grade II	767	30 to 40
Grade III	778	50 to 60
Grade IV	354	50 to 60
Grade V	132	50 to 60
	2499	

As a part of the routine examination of the sections, the livers and spleens were inspected for carbon pigment deposits and occasional examples were found to contain surprisingly large amounts.

A record was kept of age, color, sex, and, when available, of occupation and place of residence. In the more recent cases an inspector was sent to the address of the deceased to find out how long he had worked at his occupation and how long he had resided at the address given.

Both the gross descriptions and the sections were studied for the relation of pigment fibrosis to tuberculosis, acute pneumonia, organizing pneumonia, abscesses, chronic passive congestion associated with heart disease, malignant lesions and all other conditions encountered.

In an effort to determine whether or not silica was present, duplicate sections were cut, incinerated (i.e., heated in an electric oven to a temperature which destroyed the organic matter and the carbon), and examined for silica with a petrographic microscope. Highly refractive crystals in varying amounts were found in the nodular deposits. At this stage of work one is unable to say whether these crystals are SiO_2 or not. Neither is it known how much SiO_2 would have to be present to justify the diagnosis of anthracosilicosis instead of anthracosis. However, the condition, whatever it is, does not predispose to tuberculosis of the lungs, but tends rather to aid in the healing and walling-off of tuberculous foci. The findings in coal miners emphasized this fact. The series contained the lungs of 113 soft coal miners, 24 of which were placed in Grade III, and 71 in Grades IV and V. Only four cases of active tuberculosis were found, while there were 39 in which completely healed and encapsulated lesions occurred.

The peribronchial lymph nodes of all cases were graded and studied separately. While pigment

*SCHNURER, LUCY, ALLISON, WESLEY C., BOUCEK, CHARLES M., and HAYTHORN, SAMUEL R., in *J. Indust. Hyg.*, November, 1935.

cells were often found earlier and more numerously in the nodes than in the lungs, the results plotted a curve parallel to the lung findings in tuberculosis. No examples of non-pigmented or even of lightly pigmented cases of silicosis, such as are seen in stone cutters' lungs, were found in this series.

Practically no relationship between penumonia and heavily pigmented lungs could be demonstrated. In the coal miners, deaths from pneumonia were higher in the more advanced grades, but when corrected for age the factor of pneumoconiosis appeared to be unimportant. Some form of pneumonia was found in 1180 cases. Organization or abcesses were found in 136 of them. While it is true that organization was definitely higher in the heavier grades of pneumoconiosis, reaching 28% of all of the pneumonias in Grade V, the total number was too small to explain the high death rate from pneumonia in the Pittsburgh area.

The study of pneumoconiosis in relation to heart disease of various kinds showed conclusively that any grade of anthracosis may develop entirely independently of heart disease. This refutes the theory that pneumoconiosis depends upon heart complications for its development.

The results justify the conclusion that pneumoconiosis as it occurs generally in the Pittsburgh area is not a medical hazard and does not predispose to tuberculosis. No matter what the exact composition of the lung deposits here is eventually shown to be, this fact is outstanding and should remain unaffected.

Numerous charts are now being prepared to show the detailed incidence of various lung conditions in relation to grades of pneumoconiosis and a complete report of the study is under way.

Atmospheric Environment

and Its Effect Upon Man

SYMPOSIUM, *August 24-29, 1936*,
HARVARD SCHOOL OF PUBLIC HEALTH

DURING the week preceding the Harvard University Tercentenary Conference of Arts and Sciences, the Harvard School of Public Health will offer a series of four lectures daily covering the subjects of physical fitness, fatigue, air-borne disease, the occurrence and effects of gases, the role of air conditioning in modern life, the effects of abnormal temperatures and humidities, industrial operations in compressed air and its effect upon man, the pneumoconioses and their prevention, the design, cost and operation of laboratories of industrial toxicology and industrial hygiene.

To cover the expenses of the course a fee of $25 will be charged those who attend. For further information address the Secretary, Harvard School of Public Health, 55 Shattuck Street, Boston, Mass.

PROGRAM: MONDAY:

9:30 a.m.—Physical fitness, physiological and clinical appraisal for industrial and office jobs: DR. ARLIE V. BOCK, Oliver Professor of Hygiene, Harvard.

11:00 a.m.—Fatigue: DR. DAVID B. DILL, Assistant Professor of Biological Chemistry, Harvard School of Public Health.

2:00 p.m.—Air-borne disease: DR. WILSON G. SMILLIE, Professor of Public Health Administration, Harvard School of Public Health.

3:30 p.m.—Bacteria and pollen in air: WILLIAM F. WELLS, Instructor in Sanitary Science, Harvard School of Public Health.

TUESDAY:

9:30 a.m.—Occurrence and significance of gaseous impurities: WILLIAM P. YANT, Supervising Chemist, Health Laboratory Section and Supervising Engineer, Pittsburgh Experiment Station, U. S. Bureau of Mines.

11:00 a.m.—Carbon monoxide poisoning: DR. CECIL K. DRINKER, Professor of Physiology and Dean, Harvard School of Public Health.

2:00 p.m.—Organic vapors, toxicology: DR. LAWRENCE T. FAIRHALL, Assistant Professor of Physiology, Harvard School of Public Health.

3:30 p.m.—Non-toxic odors in ventilation: CONSTANTIN P. YAGLOU, Assistant Professor of Industrial Hygiene, Harvard School of Public Health.

WEDNESDAY:

9:30 a.m.—High temperatures and humidities: DR. CECIL K. DRINKER.

11:00 a.m.—Industrial air conditioning: CONSTANTIN P. YAGLOU.

2:00 p.m.—High pressures: LOUIS A. SHAW, Assistant Professor of Physiology, Harvard School of Public Health.

3:30 p.m.—Industrial operations in compressed air: OLE SINGSTAD, Chief Consulting Engineer on Tunnels, Port of New York Authority.

THURSDAY: PNEUMOCONIOSES:

9:30 a.m.—Etiology: PHILIP DRINKER, Associate Professor of Industrial Hygiene, Harvard School of Public Health.

11:00 a.m.—Clinical aspects, diagnoses, prevention: DR. W. IRVING CLARK, Physician, Norton Company, and Assistant Professor of the Practice of Industrial Medicine, Harvard School of Public Health.

2:00 p.m.—Control: THEODORE F. HATCH, Instructor in Industrial Sanitation, Harvard Schools of Engineering and of Public Health.

3:30 p.m.—Protective equipment: J. J. BLOOMFIELD, Sanitary Engineer, U. S. Public Health Service.

FRIDAY:

9:30 a.m.—Air conditioning in hospitals: CONSTANTIN P. YAGLOU.

11:00 a.m.—Air conditioning in normal life: PHILIP DRINKER.

2:00 p.m.—Design, operation, costs of laboratories:

(a) Industrial toxicology: DR. W. F. VON OETTINGEN, Director, Haskell Laboratory of Industrial Toxicology, Wilmington, Delaware.

SATURDAY A.M.:

Demonstration in the Harvard School of Public Health, and visits to the Industrial Clinic, Norton Company, Worcester, Mass.; Fletcher Granite Company, West Chelmsford, Mass.; Fatigue Laboratory, Harvard Business School.

Industrial Volaitle Solvents

DAUTREBANDE discusses the mode of action of the volatile industrial solvents, such as benzene, petroleum ether, amyl acetate and cellulose varnish.[1] Most of his observations were made on anesthetized dogs. He concluded that the volatile solvents possess the property of paralyzing the vasomotor system, and that this intoxication is rapid like detoxification. The action does not affect the centers but bears on the periphery, and especially the smooth muscle of the vessels. Both in the intact animal and in isolated organ preparations, reversibility of the effect is dependent on the duration of action of the poison. In general, if the intoxication by benzene does not exceed two minutes, the isolated organ renews its spontaneous contraction if placed in pure Ringer's solution. If longer than three minutes, this does not occur. This paralyzing action at the level of the muscle itself affects all the muscles approximately equally.

Chemical Conjunctivitis

THE claimant, in the course of her employment, handled dresses made of goods containing certain dyes.[2] She had an attack of conjunctivitis in 1926 and another in 1927, which her physician diagnosed as "chemical conjunctivitis" and attributed to the dyes in the dresses she handled. She applied to the Industrial Commission of Ohio for compensation under the Workmen's Compensation Act. The Commission denied her claim, but on appeal the Court of Common Pleas allowed it, and the order of that court was affirmed by the Court of Appeals. The Industrial Commission then appealed to the Supreme Court of Ohio. The claimant alleged that particles of the dyes in the goods she handled became detached, some of them sticking to her hands and others floating in the air, and that these detached particles thus came in contact with the mucous membrane of her eyes and caused the conjunctivitis that was the basis of her claim.

Chemical conjunctivitis, said the Supreme Court, is not an occupational disease within the category of occupational diseases defined by the legislature in the Workmen's Compensation Act of Ohio. If it is compensable at all, the claimant must prove that it is the proximate result of traumatic injury received in the course of her employment. There was no testimony to show that particles of dye did adhere to the claimant's hands and by rubbing were transferred to her eyes or that such particles floated in the air. She herself testified that she never rubbed her eyes. Her physician's diagnosis of chemical conjunctivitis was based on the history given by the claimant and on the fact that the condition did not yield readily to treatment. No microscopic examination was made to prove or disprove the presence of particles of dye on the claimant's hands or in the air. Her physician's testimony was to the effect that the actual cause of the claimant's condition was unknown to him, but that particles of dye could have caused it.

The condition of the claimant's eyes may have been due to some external irritant sufficient to constitute "medical trauma"; but, asked the court, was it "legal trauma", or the kind of trauma that the legislature had in mind when it enacted the Workmen's Compensation Act? If the court should hold that when microscopic particles of dye come in contact with the uninjured mucous membrane of the eye they cause trauma within the meaning of the law, it would be obliged to hold that trauma resulted whenever any microbe entered the body from the outside and lodged on an uninjured mucous membrane. Such a holding would upset all legislation relative to occupational diseases. Even if it should be admitted, continued the court, that the dress goods handled by the claimant gave off particles of dye, which were communicated to her eyes in the course of her employment, the claimant still would not be within the purview of the Workmen's Compensation Act, for the claimant herself testified that nothing unusual had happened to her. Therefore there was no accidental injury within the meaning of the law.

The judgment of the Court of Appeals was reversed, and the order of the Industrial Commission of Ohio denying compensation was affirmed.

1. *Industrial Commission of Ohio* v. *Armacost* (Ohio) 194 N. E. 23.
2. *Prease med.*, 43:1081; Abstr. *J.A.M.A.*, September 28, 1935.

Porphyrin in Lead Poisoning

FRANKE and Litzner* emphasize that it is highly important to determine the porphyrin content of the urine for the early recognition of incipient lead poisoning. They show that, in the absence of severe hepatic disturbances or of acute porphyria, daily porphyrin values of 500 micrograms (0.5 mg.) or a porphyrin content of 50 micrograms or more per hundred cubic centimeters indicate an impairment of the bone marrow by lead. They give a tabular report of the results of their tests on 42 workers whose occupation exposed them to lead poisoning. They found that the normal porphyrin elimination in the urine is considerably higher in healthy lead workers than in other persons. They mention observations on three men (two brothers and a son of one) which indicated that there is a familial sensitivity to lead. It was observed also that the efficacy of the treatment of lead poisoning can be determined on the decrease in the porphyrin elimination. The authors recommended that workers who come in contact with lead should be subjected to porphyrin tests of the urine at regular intervals at least during the first two years of such work. In this manner it will be possible to determine whether they have a hypersensitivity to lead.

* *Ztschr. f. klin. Med.*, November 18, 1935; abstr., *J.A.M.A.*, February 15, 1936.

"Error"

"OUR attention has been called to a footnote beneath the review in the February issue of your Journal, by Dr. C. O. Sappington, pricing Key & Conwell's "Management of Fractures, Dislocations and Sprains" at $6.00.

"The retail price of this volume is $12.50.

"Already this error in pricing the volume has caused some complaint. We would appreciate it very much if you will publish a correction on this item.

"Very truly yours,
"THE C. V. MOSBY COMPANY
"R. D. Wage, Sales Manager."

The Monetary Cost

—*of Occupational Disease Liability Insurance*—

by

CAREY P. MCCORD,, M.D.,*
Cincinnati,
and
SUE EYSTER,
Detroit

CONFUSION well confounded attends most discussions of the monetary cost of occupational disease insurance. So divergent are many published statements as to the costs of such coverage that seemingly it appears impossible that reconciliation is to be expected from any critical review. This situation is reflected in a few quotations:

"The New York State Industrial Commissioner, Frances Perkins, urged at public hearings at Albany, March 1, 1933, that the New York Workman's Compensation Law be extended to cover all occupational diseases, and further declared that the increased cost to industry would not exceed .2 of 1%, and that an increase in premium rates would not be required to meet the additional cost."[1]

Contrast this with the following:

"By extending the workmen's compensation law to 'any and all occupational diseases' incurred by a worker, the State has made a grand gesture, which, unless modified, will unquestionably result in the raising of the compensation insurance rate on foundries in New York to a degree that will drive every foundry out of the State."[2]

In Ohio the premium rate for occupational disease coverage is $.01 per $100 of payroll. This has led to the building up of a reserve fund of $735,-483.13. This is attested by the actuarial section of the Industrial Commission of Ohio in the following language:

"The Occupational Disease Fund . . . a subdivision of the Ohio State Insurance Fund . . . as of December 31, 1934, carried a net surplus, statutory and general, amounting to $735,483.13."[3]

Wisconsin, which provides a more extensive occupational disease coverage than does Ohio, and embraces silicosis (which Ohio does not), presents a different situation. Sherman is now quoted:

"With data available for losses under policies expiring in 1933, there is now some three years' experience to indicate the results of the Wisconsin law in application to compensation for silicosis. And such experience is alarming. It indicates a loss cost for compensation for silicosis, in some industries amounting to many times the accident cost—to as much as $24 per $100 of wages in one industry. But it is doubtful how far such excessive cost is a temporary phenomenon, due to be abated under changing conditions."[4]

Apparently, however, the rate was changed in 1935. as now indicated:

"The restriction to the silicotic amendment of the experience rate plan is to be removed and the foundry charges reduced 50% and the stone cutting and polishing charges reduced 40%, effective Nov. 1, 1935."[10]

Such contrasts are disconcerting. In the next coming legislative sessions of many states, various bills will be introduced relative to occupational disease compensation. Regardless of the approval or disapproval of this form of compulsory coverage by the manufacturer, his greatest concern naturally will center about the question "What will be the cost of such insurance?" It is not within the province of physicians or industrial hygienists to essay any precise answer to this nation-wide query. Logical sources of answers should be found in insurance carriers, in industrial commissions, and from the experience of industries operating in those states already requiring or providing occupational disease liability insurance. Insurance carriers appear to have been engulfed by concern, resulting from lack of accumulated experience permitting of the fixing of just rates. The state of mind of insurance companies is reflected in F. Robertson Jones' publication, "Problems in Compensation Insurance for Occupational Diseases", and in other excerpts immediately following his statements:

"Compensation for occupational diseases suddenly has become one of the major problems in American industry. Three years ago little was heard of it; today it ranks in importance with taxation, unemployment insurance, and other similar issues. Unless it is promptly and properly solved, many employers soon will discover that an overwhelming burden of cost has been imposed upon them from which there will be no adequate relief. . . . The present peril from the rising flood of litigation for damages for diseases fictitiously attributed to the failure of employers to fulfill statutory duties was unexpected, and has taken us all by surprise. . . . Where prevention is neglected a 'reasonable' rate for insurance will inevitably be startlingly high."[5]

"Casualty underwriters continue to feel their way cautiously in assuming the occupational disease hazard upon workmen's compensation risks in New York, and may be counted on to do so until a dependable basis of loss experience is had, which is not likely to be obtained for a number of years."[6]

"As to occupational diseases, Mr. Senior asserted, employers and labor have come to realize that the present all-inclusive law is neither workable nor beneficial to labor, and that amendments will be necessary to recognize the existence of accrued liabilities for diseases originating prior to the effective date of the law. The draft of the bill proposed by industry is now under discussion and if agreed to by labor will probably be enacted at the present session. The atmosphere will then be cleared and the insurance of dust hazard risks reduced to a question of normal underwriting, Mr. Senior declared."[7]

"Demanding an investigation of compensation insurance rates and losses, a group of northern California gold mine operators have made public a letter which they claim to have filed with Com-

*From the Industrial Health Conservancy Laboratories, Cincinnati, Ohio.

missioner Carpenter. The letter and agitation of this group are based upon the recent request of the carriers, through the California Inspection Rating Bureau, for approval of surcharges to meet future losses arising out of dust disease hazards, particularly silicosis. Urging that surcharges be denied as 'unreasonable and unjustifiable' the group asked the Commissioner to demand of the companies detailed reports of all premiums and all losses of the past four years 'with the balance of the losses broken down in detail'. The petition also says the rates have created a cost burden which would ruin the mining industry and throw thousands out of work."[8]

"As indicated last week, the silicosis surcharges filed by the California Inspection Rating Bureau with Commissioner Carpenter and tentatively approved by him have been materially reduced in the new schedule filed this week by Daniel W. Burbank, attorney for the Bureau. The reduction, estimated at 30%, was made possible by joint agreement by National Bureau Companies through Rollo E. Fay, and the California Association of Insurance Agencies through Frank Colridge, voluntarily cutting the 40.6% overhead and acquisition cost loading down to 15%."[9]

GRANTING that some insurance carriers have been caught napping with respect to premium charges for occupational diseases, some comfort may arise by considering the 1925-1934 accumulated experience of Wisconsin with respect to the numbers and costs of occupational diseases in that state. Wisconsin long has been regarded by some as a wilderness from which there has arisen a miasma of various destructive forms of legislation, including the "all-inclusive coverage of occupational diseases". Without holding any brief for or against Wisconsin legislation, and without any brief against insurance companies, there is now presented a formal report of the statistical department of the Industrial Commission of Wisconsin, for the 10-year period ending with 1934:

	Number of Compensable Cases Settled Annually			Aggregate amount of Indemnity Costs			Aggregate Amount of Medical Aid Paid		
		Cases of O. D. or other Occ.		All Compensable	Cases of O. D. or Other Occ.		All Compensable	Cases of O. D. or Other Occ.	
Year	Total	Injuries	%	Cases	Injuries	%	Cases	Injuries	%
1925	21137	282	1.33	3,490,021	59,146	1.69	1,100,852	14,988	1.36
1926	22177	340	1.53	3,725,860	78,970	2.12	1,122,624	13,365	1.19
1927	20473	397	1.94	3,662,406	73,743	2.01	1,114,056	17,338	1,56
1928	21818	395	1.81	3,885,850	83,093	2.14	1,250,216	17,134	1,37
1929	22630	414	1.83	4,308,571	97,864	2.27	1,433,552	25,222	1.76
1930	20070	413	2.06	4,447,141	111,139	2.50	1,398,338	31,474	2.25
1931	16943	511	3.02	3,486,195	133,887	3.84	1,101,978	24,196	2.20
1932	16195	441	2.72	3,126,912	207,165	6.63	945,953	22.027	2.33
1933	14563	415	2.85	2,711,320	134,251	4.95	857,992	19,021	2.22
1934	17180	543	3.16	2,644,173	164,911	6.23	852,550	23,738	2.78

Number and Cost of Diseases of Occupations and Other Occupational Injuries in Comparison With Total Compensable Cases: Record for Years 1925 to 1934 Inclusive.

GRANTING that some insurance carriers have been caught napping with respect to premium charges for occupational diseases, some comfort may arise by considering the 1925-1934 accumulated experience of Wisconsin with respect to the numbers and costs of occupational diseases in that state. Wisconsin long has been regarded by some as a wilderness from which there has arisen a miasma of various destructive forms of legislation, including the "all-inclusive coverage of occupational diseases". Without holding any brief for or against Wisconsin legislation, and without any brief against insurance companies, there is now presented a formal report of the statistical department of the Industrial Commission of Wisconsin, for the 10-year period ending with 1934:

From this official table certain figures stand out as significant. The average frequency of occupational diseases for the 10-year period is a little in excess of 2% of the total compensable cases, with a highwater mark in 1934 of slightly over 3%. The relationship between the compensation costs for occupational diseases and for all compensable injuries is indicated, for the 10-year period, by the percentage of 3.2%. However, the high point was not reached in 1934, but in 1932, when the percentage was 6.6. During the 10-year period under discussion, the relationship between the total cost for occupational disease medical care and medical care for all compensation cases is revealed in a percentage of 1.86.

It is generally assumed that the medical cost per case of occupational diseases is much higher than for accidental injury. In 1925 the average per case cost (282 for the year) of occupational disease compensation was $209, and for medical aid, $53. In that same year, there occurred as indicated in this table, 20,855 compensable accidental injuries, the compensation cost for the average unit of which was approximately $164. Correspondingly the medical cost per unit was approximately $52.

In 1934 the average compensation cost for the 543 compensable occupational diseases was approximately $303, and the cost of medical aid per case was approximately $43. In this same year the number of compensable injury cases was 16,637, for which the average cost was $149, and similarly, the average medical expense was $49.

If these items of analysis represent the facts then it appears that at the present time the average cost of medical care for occupational diseases is less than was true 10 years ago, and that at the present time the medical cost per case of occupational disease is less than the present time cost for the medical care of industrial injuries.

If this industrial state's experience is representative of what might be developed in other states during the same period, no warrant exists for regarding the immediate and recent past happenings as highly extraordinary in that they have extracted from Wisconsin's industries stupendous sums of money. In 1925 the compensation and medical aid expenses for all compensation cases were $4,590,873. Ten years later, that is, the year 1934, comparable expenses were $3,496,723. The total cost in Wisconsin for occupational diseases in compensation and medical aid was, for the year 1934, $188,649. In this day and time of expenditures in billions, so small a sum of money as $188,649 is negligible when this sum represents occupational disease expenditures for an outstanding state. On a per capita basis of the population in Wisconsin, this expenditure for occupational diseases is less than $.07. Although it may be true that over and above this sum of money expended for occupational disease compensation and medical care other, but limited, expenses are involved, it becomes obvious that the total amount of money to be collected as just premiums in any

one year does not grossly exceed the figures specified. However, the unhappy situation exists that whereas there are a large number of industries almost entirely free from significant occupational disease hazards, a few industries such as foundries unfortunately may provide work conditions leading to a continuous threat of expensive, incurable, totally disabling occupational diseases. In short, the outcry against the enormity of expenses for occupational disease insurance is emanating from a few truly hazard hit industries, while for most industries the costs should be insignificant.

This situation appears to be entirely obviated under the Ohio system for industrial liability insurance. There, the entire insurance fund represents a state monopoly. Although the premiums for coverage for accidental injuries vary from industry to industry, the premium for occupational disease insurance is uniformly spread over all of the insurers of the state. A foundry pays no more than a dry goods store, and neither pays more than $.01 per $100 of payroll. As heretofore noted, this trivial charge for occupational disease insurance has led to a surplus of $735,483.13, although it is probably true that this surplus is not entirely unencumbered, and that certain portions of this fund are amortized for future payments growing out of claims already settled. The payroll of Ohio industries for 1932, the year possibly representing the height of the depression, was $1,195,-920, 029.

This aggregate yielded $119,592.00 for occupational disease insurance purposes on the basis of $.01 per $100 of payroll. During that year 1069 compensable occupational diseases were reported. Under this system of an even spread of insurance premium for occupational diseases throughout all of the industries in the state, it is estimated that not to exceed two additional cents would provide ample funds for awards at present rates for every type of characteristic occupational disease that might arise in that state. This language is intended to embrace silicosis and other characteristic types of pneumoconioses. The increase to $.03 per $100 of payroll would have provided the year 1932 with a fund of $358,776.

REVERTING now to the rates respectively in Wisconsin and in Ohio, a comparison is made for one single classification, namely, steel foundries. In this connection the following statement is quoted from Bulletin 41 of the American Association of Casualty and Surety Executives:

"The effect of silicosis claims on cost can best be shown by the Wisconsin pure premium. On policies that expired in 1929 the pure premium on steel foundries on the basis of the present law was 1.97. On policies that expired in 1932 the pure premium on the basis of the present law was 8.80. And on policies expiring in 1933, it was 24.50.

"We believe that a high was reached on policies that expired in 1933 and that there will be a substantial reduction on policies that expired in 1934."[11]

For this same industry of steel founding in Ohio it is observed that the current rate for accidental injury and occupational disease insurance coverage is $1.01. If it may be assumed that all other elements are equal in the two states, then it appears that for silicosis, steel foundries in the State of Wisconsin were paying, in 1933, $23.49 per $100 of payroll solely for insurance protection against silicosis. This in general is in keeping with the statement found in Mr. Burhop's letter,[11] that during the past three completed years' experience, over 80% of all losses in foundries were due to silicosis claims.

While certain advantages may be attached to the state monopoly insurance system, it appears that this form of insurance is unlikely to become the dominant one, at least at any early time. Private insurance carriers will continue to supply the bulk of insurance of the type under discussion. Because the entire situation as to rate charges by the private carriers is in a somewhat uncertain state, it is desirable to present here only such published excerpts as will indicate some recent, and comparatively recent, actions:

"In the filing of a revised rate and minimum premiums for workmen's compensation insurance made by the National Council on Compensation Insurance, a basis manual proposal for an occupational disease program has been included.

"The council has requested on behalf of stock companies a slight increase to cover occupational disease claims arising under Clause 1B of the standard policy, in addition to a flat rate increase of 16.9% over rates now in effect.

"This program is the product of long study by various committees and will become effective in all non-regulated states December 31 for all new and renewed policies.

"The schedule includes the chief diseases occurring in the course of such work as follows: silica, asbestos, lead, chrome, exposure to anthrax, benzol, mercury, caisson work, radio-active substances, and diseases not otherwise classified.

"The average increase for occupational disease claims is distributed among various classifications in accordance with the hazards found in each. The hazard rates begin with two and run to 100; flint or spar grinding and silica grinding are found in the highest bracket, with silicosis given as the occupational disease; other high weight hazards include stone cutting and polishing with a rate of 90; red or white lead manufacturing is placed at a hazard rate of 72; dry battery manufacturing is placed in the lowest bracket of 2.

"For classifications included in the list there is a basic occupational disease loading of $.01 per unit of hazard weight and for all other classifications $.01 has been added to the weight as heretofore determined.

"This new program includes modifications to meet the various requirements of the several state compensation acts in regard to occupational diseases.[12]

"The insurance carriers have submitted two plans of coverage for which they solicit approval. They state that in the preparation of these plans they have been guided by experience under common law in New York and under employers' liability and workmen's compensation laws elsewhere. It is proposed that either plan may be used as agreed upon by the insurer and the employer.

"PLANS SUBMITTED: The first plan consists of a payroll rate for coverage in addition to which the employer shall contribute $300 toward each award.

Several examples of the rates proposed are as follows:

"Class of Employees or Employment	Rate per $100 of Payroll
Foundry	8.00
Quarrying and rock excavation	9.00
Silica grinding	12.00
Stone cutting and polishing	18.00
Sand or gravel digging	2.00

"The second plan provides for a materially lower payroll rate plus a per capita deposit. Under this method the assured would receive a refund of the unused deposit after charging it with six-sevenths of the insured losses up to $7,400 for the claimant. It is contemplated that in subsequent years the charge against the deposit for losses will be reduced in percentage and appropriate adjustments in rates made. Applied to foundry risks the payroll rate would be $2.35 per $100 of payroll, plus a deposit of $127 per employer with a loading for expenses.[13]

"Leon S. Senior, general manager of the Compensation Insurance Rating Board, this week promulgated workmen's compensation insurance rates for occupational disease classifications subject to dust hazards. The new 'all-inclusive' occupational disease law becomes operative in New York Sept. 1, 1935.

"These rates are based upon instructions laid down by Insurance Superintendent L. H. Pink on August 16, following a public hearing three days previous, on proposals of the Rating Board. The superintendent arranged rates for two plans. Plan I contemplates coverage of the employers' obligations for compensation benefits to a payment of $300 by the employer for each claim for disability lasting four months or longer. Plan II provides that the employer indemnify the carrier for six-sevenths of each loss during the first year, subject to a maximum limit per claim. Under Plan I the superintendent's rates are approximately 40% less than those requested by the Rating Board. The rates of $100 per payroll under Plan II are 20% less than those proposed by the Board; and the per capita deposit, which is part of this plan, has been reduced 50% from the amount sought by the Board. The allowance for acquisition and field supervision costs under Plan I is reduced by the Superintendent to 4% and under Plan II, 10%.[14]

"The so-called 'all-inclusive amendment' brought within the law any and all occupational diseases not previously covered. Aside from the certainty that it applies to dust diseases such as silicosis, the real scope of the amendment cannot be known until it has been in effect for some time. Hence its cost cannot be properly evaluated. To provide for this unknown cost a loading of one per cent subject to a minimum of .01 and a maximum of .05 has been added to all compensation rates. This does not provide, however, for serious occupational dust disease hazards in certain industries."[15]

THE report of the Pennsylvania Commission on Compensation for Occupational diseases includes a section summarizing the report of the committee on costs. This committee report, although providing no exact figures as to prospective costs, indicates in a helpful fashion the trends of costs and factors involving probable costs for occupational disease coverage. A number of isolated paragraphs are now included:

"The Committee endeavored to secure from states, having occupational disease provisions in their compensation laws, information as to costs, in particular in the relation of costs of occupational disease compensation to cost of compensation for accidents, and in this connection the experience of New York, Wisconsin, California, Ohio, New Jersey and Minnesota is set forth. These figures would indicate that in the states considered the percentage of claims for occupational disease coverage is not in excess of 3% of the total of the claims made, including those arising out of accidents; and that payments in Ohio, made on account of claims for occupational diseases represent less than 1½% of the total of the payments for accidents.

"As a further line of inquiry, the Committee then turned to an occupational disease compensation rating plan recently developed by the National Council on Compensation Insurance from an engineering and underwriting investigation of occupational disease costs. That plan contemplates a flat general occupational disease coverage rate, applicable to all industrial classifications, plus a specific occupational disease coverage rate applicable to certain definite industrial classifications, both to be in addition to the rate for accidental injury coverage. The plan proposed is in effect a projection of the insurance carriers' experience in point of occupational disease compensation costs.

"Based upon the census figures for 1929, the occupational disease charge was estimated at 8.4 cents per $100 of manufacturing payroll, as compared with an average compensation rate for the policy year 1929 under the accident law of about 82 cents. The increase in cost due to occupational disease would, therefore, be approximately 10%. The committee expressly pointed out that its figures did not include chronic incapacitating miners' asthma or silicosis in the mining industry.

"The difference between the figures based upon the experience derived from other states and the costs as anticipated by the National Council on Compensation Insurance is so wide that it cannot be explained wholly by differences in legislation. It is pointed out as pertinent that the insurance companies are asking for increased rates in order to enable them to carry the risks."[16]

IT BECOMES apparent that in industries furnishing a frequency of disabling occupational diseases, relatively high premium rates will be required by private carriers so long as the lack of preventive measures leads to the actual occurrence of these trade diseases.

However, in actual experience the cost of occupational disease coverage readily may be influenced to a greater extent by the attitude of the industrial commission than by the actuality and frequency of characteristic occupational diseases. By this is meant that if through ill considered generosity, favorable decisions are made by industrial commissions for occupational diseases in the absence of acceptable and substantial proof of the existence of occupational diseases, then the cost of such insurance may be expected to come enormously and unwarrantedly high. Such procedure goes far afield of the honest intent of most occupational disease laws. Occupational disease coverage should not be old age pension, unemployment, or health insurance. If, on the other

hand, the awards are made on a basis of true medical findings, as verified by an honest, unbiased medical advisory board, uncolored by petty sentiments or trends of current local political thoughts, then the insurance rates will not be exorbitant in the well protected industry, because the frequency of occupational diseases, and resulting meritorious claims, will not be so high as to justify rates beyond those which any employer will be able to carry, and carry without threatened disaster to his business.

The manner in which some occupational disease laws are drawn or may be drawn invites a flood of claims as soon as the law becomes effective, representing disease states originating previous to the date of the act itself. This immediate rush to obtain compensation may engender the belief that the number of occupational diseases that may be expected year by year will be correspondingly high and that the cost for such compensation likewise will become prodigious. It is during this early period that the wholesale panic that sometimes attends occupational disease insurance is likely to appear. After two or three years of turmoil centering about the determination of the validity of claims that may or may not grow out of conditions originating prior to the creation of the law, the incidence of occupational disease settles down to a normal, which rarely up to this time exceeds 3% of the total number of compensable cases in any state. If during this preliminary period liberality of interpretation leads to the acceptation for benefit purposes of large numbers of occupational diseases of origin antedating the application of the act, then from the very beginning the costs of occupational disease insurance may be made improperly and unfairly excessive. Without passing upon the merits or demerits of retroactive legislation, it is no less earnestly recognized that the cost of occupational disease insurance may be made enormously high if legislation never designed for retroactive purposes is, through the administration of the act, so applied.

THE KEY to low costs for occupational diseases is to be found in prevention. This long has been voiced by F. Robertson Jones, who has especially emphasized necessity for the prevention of dusty lung diseases, and notably, silicosis. It is an elaboration of the obvious to point out that if essentially all occupational diseases are prevented, no large sum of money will be required for the payment of occupational disease compensation. Furthermore, it is a practical possibility to prevent essentially all occupational diseases. At once it may be asserted that at least three-fourths of all occupational diseases need not arise.

The current belief that the cost for occupational disease coverage must necessarily be great is significantly the result of losses resulting from common law suits. It is unfortunately true that high awards have been made by juries for various occupational disease claims, and notably those for silicosis, in which no trace of the disease has been present. Trial judges have found valid reasons militating against instructed verdicts, and superior courts have in some instances upheld decisions favorable to the plaintiff when the disease upon which the suit was predicated did not medically exist. Such common law action naturally is highly expensive. Ultimately some insurance carrier is often the provider of funds for the payment of court expenses and awards. It is quite natural that, as a result, insurance companies must protect themselves against undue losses through insistence upon high premium rates.

By way of summary, it may be pointed out that for no state anticipating occupational disease legislation may any concise statement be made indicative of the monetary costs for such insurance. Under conditions of the uniform spread of occupational disease premium charges throughout the industries and mercantile establishments of a state, it appears possible that an adequate occupational disease fund applicable to all characteristic occupational diseases may be provided through a premium of not more than $.03 per $100 of employers' payroll. In the absence of opportunity for the application of this uniform spread, it appears that the average premium for such coverage may represent an approximate increase of 10% over and above the premium for accidental injury coverage. Costs for occupational disease insurance appreciably will vary, depending upon the liberality on the part of industrial commissions in the interpretation of the law, the making of awards for cases of origin prior to the effective date of the governing law, the failure to discriminate between characteristic and non-characteristic occupational diseases, the perpetuation of medical care over unwarranted periods, etc. The existence of common law liability for occupational diseases may be expected to increase the cost of protection. All in all, it appears that the most promising procedure against payment for occupational disease claims is to be found in the introduction into industry of devices, practices and methods tending to prevent occurrence of these trade affections.

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Book Reviews

By C. O. SAPPINGTON, M.D., DR. P.H.

Social Security

IT IS unusual that a distinguished surgeon should essay to write a book on such a many-sided subject as social security.

Dr. Edward Ochsner, Chicago surgeon, however, has achieved this, the book* now having gone into its third printing in 1936, just a year from the first appearance of the material.

In the 30 years or more of practice in which Dr. Ochsner has been engaged, he has had experiences which particularly qualify him to write such a volume, especially his work in the various institutions of Austria, Germany and Sweden. He argues, therefore, not from the point of view of dogmatic editorialists, but with the background of one who is thoroughly familiar with the various kinds of schemes which have been tried in European countries and have brought such havoc both to the general population and to the medical profession.

Those who have favored social insurance in other countries have always made the claim that it would reduce the number of days of sickness, lower the death rate, insure better medical services, and reduce the cost of such services. The facts presented in Dr. Ochsner's book "Social Security" appear to refute all of these claims. Thus the number of days lost by the German worker from sickness has more than doubled since social security was established in that country. Furthermore, the mortality rate is actually higher in comparable areas in Germany today than in this country. There is also reliable evidence advanced that the quality of medical services has deteriorated under compulsory health insurance, and that the costs of hospital and medical care are increasing year by year.

Dr. Ochsner further questions whether it is wise or just for any government to take the fruits of labor from the industrious, frugal and thrifty citizens and give an ever growing portion of their earnings to the lazy and shiftless. He advances the claim and furnishes the proof that social security legislation has an inevitable tendency to do this very thing, and hence it does not favor justice and fair dealing among men, but instead it encourages malingering and shirking. Poverty, he feels, is only a symptom of the world's troubles, and the real disease—human parasitism —is actually fostered by all forms of social security measures. These legislative cure-alls, although tremendously costly, are all merely palliatives, which, like all palliatives when long employed, are likely to make conditions worse instead of better.

After presenting various facts and figures and showing the destructive policies of the so-called social security programs, Dr. Ochsner concludes among other things the following: "American medicine and dentistry stand today at the threshold of their greatest opportunities and beside the abyss of their greatest dangers; the former because of their marvelous advances in the recent past, the latter because they are being pestered and annoyed by a small but vociferous group of misinformed, uninformed, unwise, and in a few instances self-seeking, selfish, self-appointed lay advisers. These are troublesome times for these two allied professions; the men who stand firm now will deserve the gratitude of future generations of men and women. Let us in this country keep the sacred light of medical learning lighted in order that it may serve as a beacon and urge future generations to still greater endeavor and guide them to new achievements, and let us bear high the torch of practical idealism so that it may not vanish from the sight of men."

The book contains 231 pages, is published by The Social Security Press, 538 South Wells St., Chicago, and the price has been reduced from the original amount of $2.50 to the present one, $.50.

* SOCIAL SECURITY, by EDWARD OCHSNER, M.D.; 231 pp.; The Social Security Press, Chicago. Price $.50.

A Treatise on Medical Jurisprudence

ALTHOUGH 10 to 15 years ago standard works on medicolegal subjects were rather scarce, there is an increasing tendency for the development of more books on this general subject. One of these* has been written by Benton S. Oppenheimer of the Cincinnati Bar, Professor of Law, College of Law, University of Cincinnati, and Professor of Medical Jurisprudence, College of Medicine, University of Cincinnati.

The purpose of this treatise, which is a practical handbook for physicians, lawyers, and students, is well expressed by the author in the Foreword: "I have endeavored to produce a book sufficiently devoid of unnecessary legal hyper-technicality to be intelligible and informative even to one who is untrained in the law. It has been my particular purpose to furnish helpful suggestions to the physician who is seeking accurate information concerning his legal rights and duties, and to aid him in avoiding those legal entanglements which occasionally ensnare the unwary. Especially — for obvious reasons — has undue technicality been avoided in the discussion of those questions which involve medical knowledge and terminology. As was remarked by Judge Parker of the California District Court of Appeals, 'The field of medicine and surgery is highly specialized and beyond our ken. Should we assume a wisdom of curb acquirement, we would prefer to remain among the subjects less liable to debate, such as dandruff and psychiatry.' It has also been my purpose to provide a handbook which may be helpful to those lawyers who are occasionally required to deal with medicolegal problems. To that end, in the discussion of each topic an effort has been made to state in language sufficiently accurate to meet the requirements of forensic argument, those legal principles which are applicable, and to furnish a sufficient number of illustrative cases or citations (most of them of fairly recent vintage) to convince even a skeptical court of the orthodoxy of the principles which are asserted."

A glance at the contents of the volume will give an indication of the subject matter contained in it: Medical Jurisprudence and the Practice of Medicine; Relation between Physician and Patient; Duties and Obligations of Physician to Patient; Malpractice; Actions; Evidence; Hospitals; Dying Declarations, and Miscellaneous.

In discussing the physician as an expert witness, the author recognizes that there are certain dif-

* MEDICAL JURISPRUDENCE, by BENTON S. OPPENHEIMER, M.D., LL.B.; 290 pp.; William Wood & Co., Baltimore. Price $4.00.

ficulties and states: "It is essential, then, that the physician-witness shall studiously avoid all appearances of parading his accomplishments or of advertising his wares. There must be no display on his part of erudition or of pride of achievement. He must scrupulously abstain from the use of highly technical language, or he must explain it in terms which are intelligible to such persons as ordinarily constitute our juries. . . . Occasionally technical terms may be required, but explanations should be promptly furnished without even awaiting request by counsel or court. Nor should the expert ever hesitate to admit, if necessary, that he cannot be positive in his answers to specific questions. If it should ultimately appear, (as it probably will) that he is in fact ignorant concerning the subject, any beneficial effects which his other testimony might ordinarily have had will be completely destroyed. It would scarcely be fair to omit a word concerning the part which is necessarily played by the advocate who calls the physician to the witness stand. He, too, must be possessed of at least a modicum of knowledge concerning anatomy, surgery and pathology—sufficient, in any event, to enable him to lead his medical witness along the proper paths, as well as to outline to him in advance the subject concerning which he is to be interrogated. The most pathetic and helpless figure in a court room is an attorney who, knowing little or nothing of the scientific or technical matters around which a controversy may revolve, seeks to examine or to cross-examine an expert witness who is thoroughly familiar with them. And it is well in most cases, for the physician who is about to be called into court, to require beforehand of counsel some information concerning the subject matter which is to be discussed and to familiarize himself (if he should not already be entirely familiar) with the available literature, so that he may be adequately prepared to meet the attempted cross-examination of some impertinent counsel who is wholly destitute of the requisite scientific knowledge, but who has learned a few technical terms or the titles of a few books which he does not hesitate to use indiscriminately and with which he may vastly impress gullible and giddy jurors."

All of which is a very intelligent way of saying that proper preparation of cases through intelligent conferences can be of value both to counsel and to the physician-witness.

The book contains 290 pages, an index of cases cited, and an index of topics. The volume is in buckram binding, 5½ by 8, published by William Wood & Company, Baltimore, 1935, and is priced at $4.00.

Second Silicosis Symposium

A Review of the Unofficial Transcript of the Second Saranac Silicosis Symposium, Saranac Lake, N. Y., June 3-7, 1935

THIS 194-page paper-bound booklet* presents the unofficial transcript of the Second Silicosis Symposium held in connection with the Trudeau School of Tuberculosis at Saranac Lake, N. Y., June 3-7, 1935. It is edited by B. E. Kuechle, Claims Manager, Employers Mutuals, Wausau, Wis. There is a foreword by Dr. Leroy P. Gardner, Director of the Saranac Laboratory, who was in charge of the Symposium. Dr. Gardner also gave introductory remarks in welcoming the large number of persons attending from all over the United States and Canada.

The official program for the Second Symposium was as follows:

MONDAY, JUNE 3—Introductory: Dr. Leroy U. Gardner, Director, Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N. Y.

The Etiology of Silicosis: Dr. R. R. Sayers, U. S. Public Health Service, Washington, D. C.

Discussion.

Dust in Atmosphere; Methods of Estimation and Significance: D. E. Cummings, Assistant Director, Saranac Laboratory.

Discussion.

TUESDAY, JUNE 4 — Pathology of Silicosis and Silico-Tuberculosis in Experimental Animals: Dr. Leroy U. Gardner.

Discussion.

Physiology of the Fibrotic Lung: Dr. W. S. McCann, Professor of Medicine, University of Rochester School of Medicine, Rochester, N. Y.

Pathology of Silicosis and Silico-Tuberculosis in Human Beings: Dr. Leroy U. Gardner.

Discussion.

WEDNESDAY, JUNE 5—Occupational History in the Diagnosis of Silicosis: D. E. Cummings.

The Clinical Picture in Silicosis and Its Importance in Diagnosis: Dr. A. R. Riddell, Ontario Provincial Department of Health, Toronto, Ontario.

Discussion.

Clinical Aspects of Silicosis: Dr. H. K. Kessler, Medical Director, N. J. Rehabilitation Clinic.

Census of Cases of Pneumoconiosis in Tuberculosis Sanatoria and the Effect of Treatment: Dr. D. M. Brumfiel, Clinical Consultant, Saranac Laboratory.

THURSDAY, JUNE 6—Roentgenological Diagnosis of Silicosis: Dr. E. P. Pendergrass, Assistant Professor of Radiology, University of Pennsylvania, Philadelphia, Pa.

Discussion.

Correlation between Pathological Anatomy and X-Ray Appearance in Silicosis: Dr. Leroy U. Gardner.

Roentgenological Diagnosis of Silicosis: Dr. H. L. Sampson, Director, Roentgen Ray Laboratory, Trudeau Sanatorium, Trudeau, N. Y.

Discussion.

FRIDAY, JUNE 7—Medical Methods in the Control of Silicosis: Dr. A. R. Riddell.

Engineering Methods in the Control of Silicosis: Prof. P. Drinker, Harvard School of Public Health, Boston, Mass.

Discussion.

Administrative Control of Silicosis in Industry: D. E. Cummings.

Silicosis as a Social Problem and its Control: Dr. A. J. Lanza, Assistant Medical Director, Metropolitan Life Insurance Company, New York City.

Thus the program was divided according to the phases of silicosis, about as follows: Monday, June 3, ETIOLOGY; Tuesday, June 4, PATHOLOGY; Wednesday, June 5, CLINICAL ASPECTS; Thursday, June 6, ROENTGENOLOGY; and Friday, June 7, CONTROL.

The following is a summary of the proceedings under these headings:

ETIOLOGY. Considering the etiology of silicosis,

* Second Silicosis Symposium; 194 pp.; Edited by B. E. Kuechle; Employers Mutuals, Wausau, Wis. Price, $5.00.

various dictionary definitions were reviewed, and emphasis was placed on the definition as worded by the Committee on Pneumoconiosis of the American Public Health Association.

The occurrence of silica in nature was also discussed, with the introductory statement that silica is the most important constituent of the minerals and rocks which make up the crust of the earth, and that it occurs in two forms, free and combined.

A tabulation of the various types of occupational exposure to silica is printed in the text in a two-column form, giving the uses of silica and the types of silica used.

In considering the factors influencing the action of silica dust particles as the exciting cause of silicosis, reference to various types of research was made, especially regarding the chemical action of different types, kinds and mixtures of dusts. Particle size and its effect upon the human relation to dust was also accorded due consideration. The role of mixed dusts was discussed, particularly with reference to the experiences of clinical types, such as are described in contemporaneous literature.

Forms for occupational histories, and various types of records, including the type of dust exposure, estimation of the individual's total dust exposure, and the dust exposure of various occupations, were printed in the proceedings.

Under the heading of predisposing causes, is a statement that the disease of silicosis occurs in the pottery, foundry, sand-blasting, abrasive, granite, tool and ax grinding, glass, slate, silica grinding, and mining industries.

The relationships of silicosis and tuberculosis and the progressive tendency of the disease were referred to, with citations of various authorities in the literature.

In presenting material on the methods of estimation and significance of dust in the atmosphere, the U. S. Public Health Service methods were thoroughly reviewed. The differences in the light and dark field counting methods were discussed. A resume of the history of standardization of equipment needed for dust estimation was given, with details regarding the standards and use of such equipment. The statement is made that, as a general rule, 15 to 20 years' working exposure to 15 to 20 millions of particles of pure crystalline silica will be required to produce readily demonstrable silicosis.

Pathology. The pathology of silicosis was given extensive discussion, and in the proceedings appears an outline which was followed in the presentation of the material in both the first and second symposiums. A summary of this outline is as follows:

1. Methods of investigation, including both human and experimental material in regard to dust inhalation, dust injection, response, and tuberculosis.
2. Demonstration of pulmonary anatomy.
3. General reactions to inhaled dusts, including the mechanism of ingress, mechanism of disposal, localization in the case of asbestosis and silica.
4. Specific toxicity of silica.
5. Histogenesis of silicosis.
6. Modifying effects of other dusts inhaled with silica including accelerators and retarders.
7. Pneumoconiosis and infection, with especial emphasis on tuberculosis.
8. Silicosis in human beings, with detailed description of nodulation.
9. Silicosis and tuberculosis.
10. Non-tuberculous infection.

Relating to the physiology of the fibrotic lung, the subject of lung capacity, capacity to expand, residual capacity, dead space, modification in circulation, diminution of total surface available for gas exchange, thickening of alveolar walls, and modification of vagus reflexes were mentioned. Cases were divided into six groups: (1) slightly more than usual fibrosis; (2) slightly more than usual fibrosis plus emphysema; (3) nodular fibrosis; (4) nodular fibrosis with beginning agglomeration; (5) dense fibrosis and emphysema; and (6) a diffuse fine reticular fibrosis. Graphs were printed in the proceedings showing the various values for pulmonary capacity in different cases in relationships between various types of capacity. Roentgenograms typical of the various groups mentioned were shown as plates; and other graphic material bearing on various relationships was also published.

Clinical Aspects. The occupational history occupies an important place in the diagnosis of silicosis. Forms for physical examination and for occupational histories were printed in the proceedings.

The clinical picture in silicosis and its importance in diagnosis, evaluating the various symptoms and establishing the importance of the different symptoms observed in an unusual number of cases occupied an important part in the program relative to the clinical aspects.

Further, relative to clinical aspects of silicosis, the results of the examination of 6536 workers in 40 different plants over a period of eight years disclosed some interesting data. Comparisons were also made in reported cases and deaths of tuberculosis, all forms, in New Jersey for the year 1934. As the second part regarding the clinical aspects of silicosis, data were given regarding the evaluation of disability in cases of silicosis. Especial emphasis was placed on the non-reliability of body function or efficiency tests as ordinarily used, or even as specifically adapted.

In recapitulating, the following statement was made: "the diagnosis of silicosis cannot be made on a single sign or symptom. While dyspnea may be regarded as a cardinal symptom in general industry, it should be considered so only for cases of advanced silicosis. The diagnosis rests on the correlation of all data, including the occupational history, physical findings and x-ray, and total social environment. The evaluation of disability in a case of silicosis can only be made on an arbitrary basis. Clinical and laboratory methods for quantitative evaluation of functional efficiency of organs or systems are in ever increasing demand; both the surgeon and physician desire to assess the degree of impairment with which they have to deal. But, one's clinical judgment based upon a knowledge of normal and abnormal physiology must provide the background of that appraisal."

As the final presentation under clinical aspects, a census of cases of pneumoconiosis in tuberculosis sanatoria and the effect of treatment were considered. Letters have been sent to 128 institutions in 35 different states, but the investigation is still in progress.

Roentgenology. As the basis for ability to interpret roentgenograms of cases of pneumoconi-

osis, the following important factors were enumerated: (1) a knowledge of the anatomy of the chest and many of the physiological problems associated with its anatomical constituents; (2) thorough familiarity with normal roentgenographic and fluoroscopic appearances and permissible variations therefrom within normal limits; (3) a knowledge of the histology of the lungs, and especially of the lymphatic system; (4) a clear perception of the pathology of the condition of pneumoconiosis and of all conditions which may simulate it in roentgenographic appearances; (5) an experienced intimacy with the roentgenographic appearances of the condition in question and of those which may bear a resemblance to it, based upon a fundamental knowledge of the pathology represented; (6) a knowledge of the physical factors involved in the production of the suspected or alleged pneumoconiosis; and, (7) the employment of the proper technique to show to full advantage any or all of the abnormalities present, for technique may fully enlighten, may so modify appearances as to be confusing, or may be quite misleading.

An especially valuable contribution in the session on the roentgenological aspects of silicosis was the correlation between the pathological anatomy and the x-ray appearance in silicosis, referring especially to the healthy lung, simple silicosis, and silicosis with infection. In presenting this, the tabulation of roentgenological changes found in silicosis together with the underlying histological conditions, as prepared by a special committee composed of Drs. Sayers, Pancoast, Pendergrass, Lanza, McConnell, Riddell, Sampson, and Gardner, at Philadelphia, November 18, 1934, was used, and this tabulation is printed also in the proceedings, having previously been printed in U. S. Public Health Reports, August 2, 1935, Vol. 50, No. 31, pp. 989-996.

CONTROL. Under the head of control, medical methods, engineering methods, administrative control, and the social control of silicosis were all given discussion.

Medical control methods were especially considered from the viewpoint of Canadian experience and statutory regulations.

In the engineering methods in the control of silicosis, dust standards were discussed: the use of exhaust hoods; description and use of dust collectors; special appliances for rock drilling; and, finally, respirators and air masks. In regard to the administrative control of silicosis in industry, the success of any plan is thought to depend upon maintaining a broad educational program. Administrative officers should be willing to assume liability for cases of true disability arising out of diseases contracted by exposure to dusts among all new employees selected for work according to the plans described in the proceedings. It should be clearly recognized that a properly regulated liability can be secured only under the prudent provisions of a well-framed compensation act relating specifically to the dust diseases. Through such efforts, results in the protection and the health and welfare of workmen and in controlling and preventing occupational disease hazards can be obtained.

One of the important points in regard to silicosis as a social problem is the proper administration of present compensation laws and the proper framing and administration of future compensation laws. It is important to keep in mind that compensation is paid for disability, and the degree of disability determines the amount of compensation.

In conclusion, the proceedings of the Second Symposium on Silicosis at Saranac Lake form a reliable source of information for those who are interested in the various phases of silicosis. Copies of the proceedings may be purchased either through Saranac Laboratory, Saranac Lake, N.Y., or the Employers Mutuals of Wausau, Wis.

Workmen's Compensation

A 52-PAGE report, supplemented by a 66-page actuarial survey, pointing out weaknesses in the administration of the Ohio Workmen's Compensation Law, deficiencies in the statutory provisions on which the Ohio workmen's compensation system is based, and recommending changes in the law itself and numerous ways of improving the administrative machinery, has been released by the Governor's Investigating Committee on Workmen's Compensation*.

1. The work of investigation and adjustication of claims decentralized under one of the following plans or combinations of such plans: (a) Increasing the membership of the State Industrial Commission and investigating and medical staffs; (b) establishment of district boards of claims of commissioners, each composed of three members on a district basis; (c) setting up of 10 or 12 district headquarters under a deputy commissioner and with adequate personnel to make investigations, hold hearings and render decisions, subject to appeal to the Industrial Commission.

2. Provision for enlarged and more efficient personnel in the medical department of the Commission.

3. Authority for the Commission to establish medical boards of review in different sections of the state to review and pass on the medical testimony in disputed and complicated cases, one of the recommendations made to the Committee by the Ohio State Medical Association.

4. Facilities established for effecting physical rehabilitation of disabled claimants and an adequate rehabilitation fund set up for this purpose.

5. Hospital facilities secured by the Commission for observation and treatment of special cases.

6. Increased emphasis given to the matter of accident prevention.

7.The Commission authorized to appoint an advisory council to assist the Commission in the execution of its powers and duties; make investigations of administrative details; and recommend statutory and administrative changes.

8. Salaries of major and more important personnel such as to make it possible to obtain the competence and quality necessary for the administration of highly important insurance business.

9. Modification of the civil service requirements to permit more careful selection of personnel on the basis of quality, efficiency and training.

10. Legislation to provide immunity from prosprofessional duty furnish medical information in ecution for physicians who in the course of their reports covering any case to the Commission.

11. More adequate funds made available by the Legislature for administration of the law.

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* *Ohio Sta'e Med. J.* (February 1, 1935).

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THE Problem

DR. GEO. G. DAVIS sort of "takes off his gloves," in talking about "The Pneumonokoniosis Problem in Industry" (pp. 111 to 128). Under his forceful presentation the Hydra-headed creature, of reptilian ancestry, which the situation appears to be, quickly discloses the source of its animation, and *the* problem as it affects industry is revealed in all its subtle and hungry plainness. Particularly potent are the words about the alleged "expert witness." The connotation is much deeper than is quickly apparent. Its parallel might be the old story of the piccolo player; indeed, the more one thinks about it the more certain he becomes that it is.

Dr. Davis has the faculty of telling one story in his text, another through his illustrations and their legends, and a third by way of the combination of all three in an article. This faculty was never more happily, and probably never more importantly, expressed than in this article.

Earned Distinction

IN HIS valedictory as retiring president of the Association for the Advancement of Industrial Medicine and Surgery (see p. 155), Dr. Willis W. Lasher suggests to the members that they pay more attention to the distinction—wherever it is theirs—of Fellowship in the American College of Surgeons and the American College of Physicians. Such a Fellowship is more than an honor; it is an achievement. And the same is true of Doctor of Public Health. The requirements for all of these are based on the degree in medicine; but they are the M.D. qualifications *plus* the certain essentials which mean that, after receiving his M.D., the individual who obtained it did something with it. There is some analogy in the fact that while all lawyers are attorneys, not so very many attorneys are *lawyers*.

In our WHO'S WHO IN INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY, such of these three designations as are applicable appear in the biographical sketch in addition to the essential M.D.—immediately following the name.

In so far as they are professionally distinctive, these distinctions are earned. Being so, the holders of them are entitled to have their designations: F.A.C.S.; F.A.C.P.; or Dr.P.H., set forth where they can be seen and appreciated. And thus there can be no compromise with professional dignity in seeing to it that they follow the M.D. in type (in directories, as Dr. Lasher suggests, and elsewhere)—in the same manner that they have already followed the M.D. in time and attainment.

The Individualistic M. D.

DR. ALEXIS CARREL'S new book "Man, the Unknown", written from a mentality trained and experienced in science, aims to make available to everyone "an ensemble of scientific data" concerning human beings. Thus a vast amount of information is compressed into its 322 pages—by a process which requires the almost doctrinal statements of a good many propositions, which are only the conclusions of observations and experiments.

This, as the author says in his preface, gives these statements a dogmatic appearance.

But the Doctor's words should not be viewed as deprecatory of his style, for the thoughtful reader will not argue with the statements, but instead will expand them as best he can into a picture of all of the elemental factors which are condensed into their precise incisiveness. Even the lay reader can do this with considerable profit to his fund of knowledge.

One of the pungent groups of phrases which can be so expanded—into a solution of almost the whole problem of social adjustment—is that in which Dr. Carrel indicts the society of today for ignoring the individual; taking account only of "human beings"; treating men as abstractions; confusing its concepts of the person as an individual entity and as a mere unit of population; and thus falling into the fundamental error of attempting the "standardization of man".

It is particularly interesting at this time to have such a profound student of the science of man as Dr. Carrel build up to the conclusion which is contained in his last chapter, "The Remaking of Man", that all our problems—social, economic, governmental—will find their answer in the emancipation of the individual as an individual, rather than in any conformity to the plans, schemes and systems which would still further treat him as a regimented unit.

But this comment on Dr. Carrel's very remarkable and absorbing book is not intended to review it, but only to elicit, if possible, a spark from the apposition of two heavily charged facts:

These are, (1) the fact of the fundamental error in attempting the standardization of man, which he so well describes, and (2) the fact that the pro-

fession, from the eminence of which he writes, necessarily, and without any element of error, contemplates the individual from the opposite point of view, as an individual, and the more distinguishes itself as it gives him the skill and science than which there is nothing more individual.

IN THEIR concepts of human beings, the New Deal, as the exponent of regimentation, and the M.D. as the persistent individualist, have opposite polarities. There is of course a middle situation, a condition in which the two extremes can meet, and where they can mingle to the advantage of mankind. Wherever that status may be found, governments and social groups are only groping toward it. The doctors, however, are approaching it with sure steps. Political parties have to experiment; the medical profession has only to broaden its outlook.

This broadening is taking place in three ways. The first and most apparent is in the relation of public health, where medical science has already accomplished miracles of prevention, sanitation, hygiene.

The second is in the relation of industrial medicine and surgery, where the same kind of miracles, in smaller manifestations, have come to be taken for granted.

It is in this relation that the physician and surgeon has the best opportunity to broaden his concept of the individual as a human being without in any way interfering with his fundamental concept of the individual as an individual. For here he encounters him as a human being in the employment situation; but as an individual in the problems of sickness, injury, disease—which occur to him while he is at work exactly as personally as if they came when he was unemployed.

But in this relation there is superimposed upon these problems the additional consideration of the individual's place as a producing entity, to be restored to his economic status, and the same individual's possibilities as an infective or negligent or accident- or disease-prone unit—the possibility of conflict between the two requiring to be very thoroughly understood. And pervading both considerations is the amplification of the cure of the trouble, whatever it may be, to the prevention of its recurrence, as well as the recognition of the fact that accidents, sicknesses, and diseases occurring in employment are a supercharge upon costs, and thus an uneconomical additional charge upon the labor which produces the commodities of commerce or the buyers who consume them, or both.

THE third way in which the medical profession is broadening its appreciation of the individual as a "human being" is education. The manner in which the leaven of this necessity has been at work is indicated in the following, from the daily press:

"A physician must study the human race as closely as he studies the human body if he is to achieve either personal success or maximum social usefulness, speakers emphasized yesterday before the annual congress on medical education of the American Medical Association, meeting at the Palmer house.

"One reason for failure of medical students to get a sound social education along with their professional education is the failure of their teachers to maintain contact with the problems of society, said Dr. Nathan B. Van Etten, speaker of the A. M. A. house of delegates. Commenting on numerous criticisms of medical teaching which he had received from interns and young physicians at Morrisania hospital in New York, of which he is director, he said:

" 'Too often the teacher is so absorbed in his specialty that he does not care for general contacts. He fails to function as a citizen. If these criticisms are correct or justified, he is unfit to develop practically useful physicians or to inspire his students with high social objectives.'

"Examination of students seeking internships at Morrisania hospital discloses too many students with a fine didactic knowledge of the textbooks they have studied and the lectures they have attended, but little idea of how they shall turn that knowledge to the service of their patients.

"He cited one example of the examination of a candidate on the treatment of a married man who had contracted a social disease. The candidate was letter perfect on medical treatment, but the thought had apparently never entered his head that it was also part of his function as a physician to assist the patient in solving the crises in his domestic life arising from the ailment.

"While other speakers suggested lengthening the regular medical course to five years, to permit more instruction in cultural and social science subjects in a two-year pre-medical course, Dr. Stanhope Bayne-Jones, dean of the Yale medical school, suggested a five-point program for instruction of medical students in 'the great group of facts and forces which will bear upon the physician himself as an individual and as a practitioner of a distinctive profession.' "

A Cause of Unemployment

THE monetary cost of occupational disease liability insurance may be only a small percentage of payroll, but it is one small percentage added to a growing number of other small percentages. Injuries have become accustomed to their proportion; the little factor for unemployment insurance is no longer a stranger in some localities, and soon will be at home in all; the new "social security" pensions are scheduled for a cut-in next year—and the end is nowhere in sight. But possibly someone will think, pretty soon, to add up all these indirect labor costs—not omitting the percentages for sickness, absenteeism, and the ascertainable expense of the tolerable idiosyncrasies which permeate the payroll. The sum total may be as enlightening as that obtained by the visitor at the railway fuel convention many years ago. He learned that one device would save this percent of coal, another one that percent, and still another a different percent. Adding the percents, he found that a locomotive equipped with all of the devices would operate on 8% less than no coal at all. The law of diminishing returns, however, knows no politics.

The fact that it is operating throughout industry in connection with the increasing liability of each employer to each employee is evidenced by the growing attention to pre-employment physical examinations. The employer is being made progressively more liable to those he employs; he is still free, however, to select the ones to whom he must discharge this liability. And if better selection reduces the number he can get along with, whose fault is it?

Industrial Medicine and Surgery

Illinois' New O. D. Laws

ILLINOIS' new occupational disease and accident compensation bills, recently passed by the general assembly to replace statutes which the state Supreme Court ruled unconstitutional, became law today (March 17, 1936) after Gov. Horner had signed the bills in Chicago last night.[1]

The measures, five in number, are known as Senate Bills 8, 9, 10, 11, and 12, and have been designed to provide for the comfort, safety and health of all the workers in the state and to give them and their dependents protection in the event of disability or death arising from occupational disease or accident.

The five bills were drafted after seven months of study and conferences at which chief participants were Peter J. Angsten, chairman of the State Industrial Commission; Oliver E. Mount, representing the employers of the state, and Victor Olander representing employees.

In general, the new bills provide that in the event of death which results from accident or disease of an occupational origin, the dependents of the victim—members of his immediate family—shall be compensated by an amount equal to four times his average annual earnings, within minimum and maximum payment limits of $2,500 and $4,000.

The maximum and minimum compensation payments are modified to some extent by the number of dependents involved in each case and, in the matter of personal injury or contraction of occupational disease, by the extent of the incapacitation. In the event of permanent disability from accident or disease, the afflicted worker shall be paid in monthly installments the total compensation his dependents would have received in the event of his death, and, in addition, he can collect an annual allowance of from 8% to 12% of his yearly compensation award as long as he continues to live.

The bills not only provide financial recompense for injury, disease or death occurring from employment, but carry provisions for the protection and safe-guarding of the workers of Illinois. In this connection, the bills provide for the removing of dust and dirt from grinding, polishing and buffing operations in factories within the state. The Industrial Commission, which is in charge of the operation of the measures, is authorized to conduct regular inspections of all places of employment.

Prevention vs. Compensation

IT IS cheaper to prevent eye accidents than to pay compensation and to make up the loss in time and efficiency caused by these accidents. It seems almost inexcusable, therefore, that employers overlook any possible safeguard.[2] Two railroads in the United States have bought goggles at their own expense for the men who were subjected to eye dangers, and both of them report that there is a satisfying decrease in the number of blind eyes during the year. The cost of prevention has been absorbed by fewer injuries.

Before the era of mass production, most eye losses were caused by gunfire, discharges from blasts, and, occasionally, from flying foreign bodies in machine shops; but, with the advent of high-speed tool steel, which will retain its temper while at white heat, and with rapidly turning lathes, the number of foreign bodies which penetrate the globe is enormously increased. Unfortunately, many of these metallic materials are nonmagnetic and it is more difficult, therefore, to remove them from the eye without doing considerable damage.

While there has been a reduction in the number of accidents to workers using hand tools, it has been offset by a vastly increased number of accidents to machine tool workers. The use of abrasive wheels, emery, carborundum, etc., together with the polishing materials, also has increased the number of accident cases having minute foreign bodies embedded in the cornea. Electric welding, now a much-used technique in industry, has also taken its toll of sight. Unless the operator's eyes are carefully shielded—and many of the masks are insufficient protection—the lids may suffer a burn and blind spots may develop in the retina. It has not been realized that bystanders, especially those working in proximity, may suffer almost as much as the operator.

The electrical discharge in blasting has materially lessened one danger to the eyes. The old-fashioned lighting fuse and black powder frequently would not burn, or burned so slowly that, when investigated, it went off and ruined the eye of the employee.

In mass production, where much of the material is produced by automatic machinery, there will always be the danger of flying particles from one machine hitting an operator at another machine, even as far away as 30 feet. It would seem that there could be a set-up of machines in irregular intervals that would lessen this danger, or that a screen of plate glass could be interposed between these machines to prevent accidents.

One rule which I think should always be enforced is that any man grinding a tool on an abrasive wheel, unless the wheel is amply protected by plate-glass guards, should himself wear goggles. Another regulation to which I think there should be no exception is that any man who has lost the vision of an eye should wear a glass on the remaining eye for protection from foreign bodies, even though no correction is needed in the glass itself. I have had a few cases where the second eye was lost in the same manner as the first, when the loss of both eyes could have been easily avoided by the simplest kind of glass, as the particles are so small they do not break the lenses. Few eyes have ever been injured by broken glass from the spectacle lens.

The safety-first programs should include instructions against the use of files and very highly tempered steel for punches when they are not intended for that purpose, and also against the use of cheap cast-iron hammers which are often thought to be good enough for household use. In industry, hammers of lead or copper should be supplied and battered punches ground off or replaced.

The factory hospital of industrial plants is an important factor in efforts to reduce eye losses. The first treatment that is given an embedded foreign body often determines what the disability will eventually be; in the smaller concerns, employing fifty men or less, these cases are not so likely to be properly treated as in one of the larger shops.

A trained employee has a money value to his employer and should not be subject to the ordinary turnover of labor. The present financial depression has proved that a group can be given special care at a lower fee, if it is not subject to loss in collection. This type of man is intelligent enough to appreciate the value of his eyes, the most necessary tool in his occupation. With proper protection from accidental injury; with care when accidents occur; with advice as to the prevention of diseases that may cause visual loss including examination for glasses, the total loss of vision in modern mechanized industry could be reduced to the minimum.

1. *Daily Times*, Chicago, March 17, 1936.
2. *Sight Saving Review*, reprinted in *Industry*, March, 1936.

Bone Repair and Failure After Fractures

THE detailed process of repair after the fracture of a bone should be thoroughly understood by everyone who attempts to treat fractures.[1]

The formation of a hematoma is essential for normal bone repair after fracture.

We have no method by which the calcium-phosphorous balance can be measured so as to prognosticate repair of fractures.

Causes for failure to repair normally after bone fractures are local and preventable in the majority of cases.

Treatment of a fracture should be centered more upon the local findings and immediate careful handling of the injured parts than upon the general metabolism of the individual.

We have no treatment that will guarantee to repair a fractured bone. This must be done by the body cells, the action of which is little known.

Early replacement of the fractured bone ends in as nearly perfect apposition and alignment as possible, and perfect immobilization to protect the matrix is essential for normal bone repair.

Delayed repair calls for special care, probably not had at the proper time in most cases.

Failure to repair calls for surgical intervention and careful watchfulness, until complete repair has been attained.

Industrial Carpal Bone Injuries

FIRST in importance,[2] because the most frequent of the carpal injuries and often most serious from a disability standpoint, are fractures of the carpal scaphoid. This injury is

1. DR. E. P. PALMER, *in Southwestern Med.*, October, 1935.
2. DR. R. E. PALMER, in *Southwestern Med.*, October, 1935.

not uncommon in industry. It is usually produced by indirect violence from falls on the hand extended in radial flexion. It is often associated with other injuries and dislocations of the wrist and carpals. It is only to be recognized early by means of the x-ray. Non-union of the fragments together with rarefaction or atrophy of the bone, associated perhaps with arthritis of the wrist, may lead to serious and prolonged industrial disability. Of the two cases of this fracture to be presented, one, complicated by other injuries in the same wrist, illustrates the difficulties sometimes met in diagnosis and treatment. The other shows the industrial end results where non-union, condensation of the bone and arthritis have occurred.

Case No. 1, E.D., white, aged 18. Referred for examination November 9, 1934, seven months after.

History of Accident: The left hand was caught between a trailer and a truck body when they came together. The exact mechanism of the force applied is not known. Initial report was fracture of the radius and cuneiform, with dislocation of the carpus. The x-ray shows fracture of the styloid process of the radium, with dislocation of the proximal carpal row forward, the os magnum and cuneiform backward, with fracture of the cuneiform. After reduction of the carpal bones, under ether, the x-ray shows the carpal bones in proper position without displacement of fragments and with fracture of the cuneiform.

Because of the multiple injuries in this case, especially relating to the carpal joints, and because the fracture of the scaphoid was not recognized at the time, early passive and active motion was instituted. Several films taken along at intervals did not show fracture of the scaphoid clearly, but five months later the film shows the ununited bone. Some time later the attending surgeon reported a 75% disability of the hand and asked for consultation to consider the advisability of operative treatment. Films taken at that time, November 9, show the fragments of the scaphoid apparently united in good position. From another film taken on November 30 the fragments are again reported ununited. Manipulation under the fluoroscope also showed that union had not occurred, and finally films reveal the ununited fracture with condensation of both fragments.

The lesson to be learned from this case is not to underestimate the industrial seriousness of carpal injuries, and to realize that when prompt recovery is not made, it sometimes takes painstaking study to determine the exact pathology.

Case No. 2, C.W.O., white, aged 34. Referred for examination November 3, 1934, because of disability from a wrist injury sustained about five months before.

History of Accident: On July 16, 1934, when handling timbers, a 6x6 timber slipped and struck him on the back of the left wrist. From x-ray taken at the time a fracture of the carpal bone was reported.

The following additional history was obtained: In January, 1931, an accident occurred, which resulted in a fracture of the left scaphoid, after which he returned to work on light duty in 42 days. He states that while the wrist bothered him, he managed to get along until nine months later when he was again injured, sustaining a contusion of the same wrist—fibrous union. At this time he was off work for 26 days; he states that he was unable to use his wrist with any degree of freedom without pain and weakness for a period of two years, and that following that period it was gradually getting stronger up to the time of the present injury.

For the past seven months the member has been treated conservatively in a cock-up splint. The industrial end result in this case is shown in the present condition of a painful, weakened wrist, limitation of motion equal to 50% of normal, and an equal loss of grip and carrying strength. Present x-rays show the ununited fracture, in the increase in density of fragments, and the arthritis at the wrist point. The condition is apparently stationary, for the time being at least. Whether or not operative removal of the bone at this time would lessen the disability does not come within the scope of this paper.

Carpal bone injury of a somewhat different type and one which, while not of frequent occurrence, is of considerable industrial importance, is a traumatic osteoporosis of one or more of the carpal bones. This condition apparently affects the semilunar most often and is then usually referred to as Kienbock's disease of the semilunar. The same osteitic condition, when occurring in the scaphoid, is known as Preiser's disease. The industrial importance of this condition relates to the difficulties of early recognition and to the fact that by the time the disability has become sufficiently serious to be recognized, perhaps months later, the original slight accident which may have been responsible has been well-nigh forgotten.

Case No. 3, T.B., white, male, aged 23, was referred for examination January 18, 1935, six months after the injury. The personal history is unimportant, except a Neisserian infection six years ago and a similar infection contracted during the past three months.

History of Accident: On or about August 1, 1934, while changing a tire on a truck with two tire irons, one of the irons slipped. He thought at the time that it was the left one, and that he had sprained his left wrist, but now he thinks perhaps it was the right iron which slipped and flew over, hitting him on the left wrist. At any rate, the injury was apparently not severe at the time and he continued working, providing himself with a wrist band. After a few days the condition seemed to get better, but it always troubled him a little. Three or four weeks later he noticed that on grasping objects or lifting with his left hand, he had considerable pain in the wrist. This condition became progressively worse, and about two months after the injury he consulted his surgeon. An x-ray taken at that time did not show a fracture, and the case was treated as a sprained wrist over a period of a few weeks and then not heard from again until January 17. The patient reported that following rest in a splint the wrist had apparently recovered, but on starting to use it again the pain and disability recurred. X-ray taken then showed an apparent fracture of the semilunar bone.

This case presents a rather typical history and x-ray appearance of Kienbock's disease, and is presented for the purpose of calling attention to this type of carpal injury purely from an industrial standpoint. When an apparently trivial injury to the wrist does not recover in due time, careful and painstaking investigation should be made that the diagnosis can be had at the earliest possible moment. While numerous dislocations, fractures and other traumatic conditions occur in the carpus, these few cases will call attention to the necessity for careful consideration of wrist injuries. As accurate diagnosis of lesions in this region can only be made by x-ray, early, well-taken and carefully studied diagnostic films are important.

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The Treatment of Carpal Bone Injuries

THE wrist is a complicated joint.* The hand is united to the forearm by three joints: the radiocarpal, the intercarpal, and the carpometacarpal joints.

This discussion does not include the fractures of the lower end of the radius, but these fractures are frequently associated with fractures of the carpal bones and have a direct bearing on the treatment. One might not be able to put up a fracture of the lower end of the radius as he would like to if complicated by a fracture of the carpal bones, and vice versa.

In certain fractures of the posterior lip of the lower end of the radius the first row of carpal bones has a tendency to subluxate backward and, if complicated with fractures of the carpus, the problem indeed becomes important.

Frequently a man receives an injury to his wrist and thinks it only a sprain and does not report for treatment, thinking that it will soon be better and he, many times, continues working unless his work is so heavy that it is impossible. Then when the case does not progress satisfactorily the man comes and it is is found that he has a fracture of the carpus. These fractures occasionally do not show up in the x-ray, not even in good films with proper exposure and proper development. The x-ray should be repeated in 10 days to two weeks if there is any reason to believe that the injury is more serious than a sprain of the wrist. It is necessary to make an accurate diagnosis, as the treatment of fractures of the carpal bones is different from the treatment of sprains of the wrist. In fractures long immobilization is necessary, while in sprains early active motion saves time. Treatment varies with the bone fractured. An associated dislocation should be determined, as this also varies the treatment. The complicating dislocation is usually of the semilunar. Because of its shape, it has a tendency to slip out of place when the carpal bones are compressed between the lower end of the radius and the hand. The dislocation should be reduced as soon as possible and before an attempt is made to treat the fracture.

The carpal scaphoid fracture is the most common of the carpus and comprises about 0.5% of all fractures. It is commonly seen in young men, and the frequency of the fracture of this bone is because the scaphoid and semilunar transmit the force of the lower end of the radius. Because of the shape and position of this bone it has a tendency to fracture, while the semilunar has a tendency to dislocate or slip out of place. The great majority of these fractures are caused by falls upon the hands. In most cases the fracture is irregular across the bone near the middle. Occasionally the bone is comminuted and may be intra-articular with little displacement. This may lead one astray in the treatment as the first x-ray would show no displacement, and an insecure dressing used. When the x-ray study is made at the end of two weeks or later, instead of a nice little crack with no displacement, a fracture with separated fragments is found.

In the cases of fracture of the scaphoid associated with dislocation of the semilunar, or fracture of the semilunar, or fracture of the lower end of the radius, or the lunar styloid, the additional injuries must be taken into consideration in the treatment. A crack across the scaphoid may be enlarged into a gap with large separation of the fragments after the manipulation necessary to replace a dislocated semilunar. It is best to check up after the manipulation.

Absolute immobilization for a long period of time of all carpal fractures is necessary. Our usual difficulty is not starting the treatment soon enough. Many times we do not see the patient at first and do not have an opportunity to start early treatment.

Ready made splints are never adequate. They do not fit and they never immobilize the thumb, which is necessary. The most adequate splint is a circular cast snugly applied from the upper third of the forearm to the metatarsal phalangeal joint of the fingers and the interphalangeal joint of the thumb. The best position, usually, is a slight cock-up and radial flexion or abduction with the thumb in abduction. This approximates the styloid of the radius and the trapezoid against the outer fragment and compresses the outer fragment against the inner fragment which is jammed up against the os magnum. In this way the broken fragments can be held in approximation. This cast is left on eight to 12 weeks, better 12. If it becomes loose it is removed and another immediately applied. The cast is removed permanently only after satisfactory x-rays have been taken showing union, and this regardless of the length of time.

In old cases the treatment is prolonged immobilization in tight skin-fitting casts in such a way that the fingers can be used to stimulate blood supply. The next thing to try in case of failure is drilling of the fragments with a fine drill or even inserting a small autogenous bone peg after the drilling. Removal of ununited fragments of the scaphoid is not good treatment if it can be avoided. A crippled wrist invariably results. It may be the lesser of two evils; that is, the crippling may be less after the broken fragments have been removed, but it may be greater. In removal good results depend largely upon early active motion. Physical therapy helps and should be used. Active motion is most important, and as definite exercise with something definite to do. Considerable disability must be expected.

Treatment of fractures of other carpal bones is also based upon the above outlined principles. These fractures are not so often seen except in crushing injuries where there is a large amount of injury to soft parts as well as bones. Ankylosis of the carpal bones and marked disability is the usual result in spite of treatment.

In summing up: be sure that the case thought to be a sprain is not a fracture. Long, adequate immobilization is all important. Immobilize in such a way that the fragments are held together. Do not remove the cast too soon, and do not be in a hurry to remove the cast in order to start passive motion and physical therapy. In old cases long immobilization, drilling the fragments, or the insertion of small autogenous bone pegs may accomplish union. A fibrous union is not inconsistent with good functional result. Do not be in a hurry to remove these fractured bones and fragments, as the results after removal are often unsatisfactory.

*Dr. J. M. Greer, in *Southwestern Med.*, October, 1935.

Periodic Surveys

ONE of the editors[1] has recently been engaged in visiting a number of medical departments in industrial establishments in New York City. One of the lapses he finds, particularly in the plants where there is only one nurse, is that the nurse is apt to take many things for granted. This applies particularly in the sense that she often fails to keep accurate data, to analyze the trends in her own department, to check on the employees who are apt to report frequently for medical advice, assistance or rest, etc., etc. The lay executive of one large corporation recently came to the office of the editors with the request that forms be developed which he might hand to his industrial nurse for doing just these things. It is strongly advised that all nurses in industry, if they have not already done so, should develop such forms and keep an accurate record and check upon these and other matters.

Occupational Dermatoses

AT A RECENT conference on occupational dermatoses, held under the auspices of New York University College of Medicine and the Industrial Hygiene Committee of the New York Tuberculosis and Health Association, a number of interesting papers were presented.[2]

Dr. Louis Schwartz, Senior Surgeon of the United States Public Health Service, discussed the incidence of industrial dermatoses. Dr. Schwartz concluded from the examination of many cases of workers in various industries, that it might be conservatively estimated that more than 1% of the workers engaged in basic industries suffer at some time during the year with an occupational dermatitis. Taking into account the fact that there are about 25 million workers engaged in industry, Dr. Schwartz estimated that there would be at least 250,000 cases of occupational dermatoses in one year in the United States. On the basis of compensation costs and the cost of medical care, Dr. Schwartz estimated an economic loss of $4,000,000 a year as a result of occupational dermatoses.

Another paper dealt with the role of allergy in occupational skin diseases, noting, among other things, the following: (a) that any worker may have a dermatitis from sources other than his occupation; (b) that this dermatitis may be due to work in the industry or occupation, but may be of the familial-type, such as a pharmacist handling caroid, etc.; (c) the dermatitis may be due solely to the industry itself; (d) each industry presents its own specific problems and its own type of dermatitis, depending

1. and 2. *Safety Engineering*, February, 1936.

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

THE object of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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upon the agents used and the way in which the worker comes in contact with them; (e) the role that allergy plays can only be determined by the most careful study of each individual case.

A third speaker pointed cut that the substances which may cause dermatoses by direct action on the skin number several hundred, while those which act systemically are much fewer in number.

Physical Examinations to Detect the Accident-Prone

PERIODICAL medical examinattions, followed by inquiries to determine whether corrective measures have been taken, are necessary if a health program is to be successful, Dr. Hart E. Fisher, Chief Surgeon of the Chicago Rapid Transit Co., Chicago, told delegates at a session on First Aid and Health Service in Industry, at the Twenty-Fourth Annual Safety Congress and Exposition in Louisville in October, 1935*.

A thorough health program, Dr. Fisher said, will produce the following results: place the employee in a job which he can perform with safety and efficiency; reduce the annual labor turnover; increase the average life of the employee; reduce absenteeism; assist in health maintenance and reduce the cost of medical expense in the event of illness or injury; eliminate fraudulent claims for personal injuries due to undetected physical defects; reduce accident frequency and severity rates; reduce the annual death rate from natural causes; aid in the detection of the accident-prone employee; reduce the possibility of delayed convalescence from injury due to complications following accidents; promote an older average age of employees; and promote favorable public opinion.

In the course of his talk, Dr. Fisher, with the aid of two assistants, demonstrated a physical examination of the kind used by the Chicago Rapid Transit. One of the first phases of the examination, he said, is to determine the height and weight of the employee. Height is often a determining factor in safe and efficient performance. Excessive or insufficient weight may also be productive of poor health and accidents, he said. Employees are examined for muscular power, color interpretations, visual range, hearing, condition of the mouth, nose and throat, heart disease, blood pressure, respiratory disease, nervous conditions, defects of the foot structure, and condition of the internal organs.

A complete physical examination must include urinalysis, blood examination, x-ray interpretations, tests of the fluids and excretions of the body and metabolism tests. If the employee appears below par, and a definite diagnosis is not reached in all of these tests, further study in the laboratory is required for sputum tests, gastro-intestinal and Wassermann examinations.

The use of complete examinations of this nature has been vindicated in the experience of his company, Dr. Fisher said. Contrary to some beliefs very few persons lose their positions by reason of these examinations. While many defects may be revealed, their nature is such that they can be readily corrected, so that the individual may remain at his occupation. If this cannot be effected, it is generally found possible to place the employee in another position in which the defect will not be a noticeable handicap. When employees discover these facts they welcome periodic physical examinations as a part of the program to reduce accidents.

* *Safety Engineering*, February, 1936.

Occupational Diseases in Ohio

REPORT of the Bureau of Occupational Diseases, recently made to the Director of Health, Dr. W. H. Hartung, by Dr. Emery R. Hayhurst,* consultant in occupational diseases and acting bureau chief, shows that 1400 cases were reported in 1935 (omitting 88 "incompletes"), a decrease of 156 from the preceding year (1556), but the second highest for any year since the reporting law became effective in 1913. Two hundred and eighty-four cases or 20.3% were females. The year before, 290 or 18.6% were females.

This total of 1400 cases was reported by 671 physicians, or 7.5% of the 9000 practising physicians in Ohio in 1935, and was employed by approximately 785 different employers.

The accompanying table tells the story for those which were compensable—1294 cases, and 9827 in the eight-year period.

In 1935, Dermatitis, with 875 cases, constituted 61.2% of the total reported. The leading causes of dermatitis were: oils, greases and cutting compounds, 142; cleaning compounds

**Ohio Health News*, February 15, 1936.

(including six dry cleaners), 68; paints, lacquers, varnishes, enamels, thinners and turpentine, 58; petroleum products, 49; stains, dyes and dyed goods (chiefly the last-named), 46; plating and cyanide solutions, 45; chemicals variously specified, 44, and mixed and unspecified, 29, to which may be added acids, 18, and soldering solutions, seven; rubber, 40; dusts, variously specified, 40; bakelite and synthetic rosins, including formica, 39; plants, such as flowers, vines, woods, vegetables and grains, 34; chromium compounds, 25; inks, blue prints, etc., 22; soap, chiefly manufacturing, 21; bakery and confectionery goods, 18; leather, hides and shoes, 17; glue, hair and wool, 16; meats and carcasses, 14; infestations from handling money, rags, etc., 13; lime and cement, 12; etc.

Lead Poisoning comprised 102 cases (60 less than in 1934). The chief causes of lead poisoning were: storage batteries, 23; painting, 16; automobile manufacturing and repairs, nine; brass and soft metals, nine; lead manufacturing and lead registered 218 cases, of which 60 were females; and prepatellar bursitis or "house-maid's knee", 25 cases, of which five were females. Compressed air involved only one case, the effects being upon the ear.

The following compensable diseases reported no cases: anthrax, glanders, mercury, phosphorus, carbon bisulphide, epithelioma or cancer, manganese dioxide, and radium poisoning.

Interest centers chiefly around the non-compensable cases, 106, including 13 females (seven of whom suffered constitutional poisoning). In 89 of the 106 cases, a harmful agent was specified: dust (pneumoconiosis), 52; tenosynovitis (other than the hand), six; chronic or repeated carbon monoxide poisoning, four; cyanide poisoning (other than potassium cyanide which is compensable), four; and the balance scattered. The remaining non-compensable cases, 17, were classed as afflictions since the causative agents were not specified. There is a tendency not to report these cases, as they are not compensable, although the law requires all occupational diseases to be reported.

Analysis of the 52 dust cases showed diagnoses as follows (only a few checked by this Department*): silicosis, 24; silicatosis, one; asbestosis, one; combined silica, 14 (anthracosis, etc.), and other and unspecified, 12. The dust cases came from various industries and operations such as foundries, grinding, polishing, buffing, sand-blasting, sand-papering, coal mining, etc. Only five of the 19 tuberculosis institutions in the State reported upon pneumoconiosis. Hamilton County, the largest (635 beds), reported no case of any form of pneumoconiosis. Four others reported a total of 25 cases, but of these, 18 had entered the institutions in previous years (two of which already were of record). Of these 25 institutional cases, 15 were reported as complicated with tuberculosis.

Only one case of tularemia and one of undulant fever were reported as industrial in origin.

During the eight-year period, 715 non-compensable cases were reported, of which 491 were "agent" cases and 224 were "afflictions". Of the 715 cases, 234 were due to inhaling dust, 11 were asthma, 47 bronchitis, 67 tuberculosis (allegedly industrial), eight upper respiratory irritations, and the balance scattered.

Summarizing, of the 1400 cases reported in 1935, 223 occurred chiefly through inhaling the substances, 915 by way of the skin (including eight eye cases), 224 through strain, 27 through friction or pressure, and 11 through other non-specified means.

Acute mishaps, even though due to poisons, corrosives, asphyxiating agents, etc., are not included in any of the figures.

In 1935, one plant physician reported 80 cases, one industrial physician, 62 cases, another plant physician, 28 cases, and so on. But it can be seen at a glance that private physicians reporting one or two cases for the year made up the vast majority.

From the date of the first report received May 15, 1913, to the end of 1935, a total of 18,843 cases were reported. Of these, 2575 were reported in the eight years prior to the time compensation for occupational diseases began (August 4, 1921), or an average of 322 cases a year; but since compensation began, 16,171 cases have been reported, or a yearly average of 1121 cases.

Schedule Number	1928	1929	1930	1931	1932	1933	1934	1935	Total
1. Anthrax	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Glanders	.....	.....	.....	.....	.....	.....	.....	.....	.....
3. Lead poisoning	180	183	134	114	148	134	162	102	1,157
4. Mercury poisoning	.....	.....	.....	.....	.....	.....	.....	.....	.....
5. Phosphorus poisoning	.....	.....	.....	.....	.....	1	.....	.....	1
6. Arsenic poisoning	.....	2	1	2	3	1	3	3	15
7. Benzol poisoning (and nitro- or amido-derivatives)	11	11	3	6	9	3	10	7	60
8. Volatile petroleum products poisoning (gasoline, benzine, naphtha, etc.)	3	4	2	6	5	9	10	7	46
9. Carbon bisulphide poisoning	1	1	.....	18	2	1	1	.....	24
10. Wood alcohol poisoning	1	.....	.....	1	.....	.....	.....	1	3
11. Dermatitis*	894	985	884	833	621	726	913	875	6,730
12. Epithelioma (skin or eyes) due to carbon, pitch, tar or tarry compounds	3	2	1	5	1	1	.....	.....	13
13. Compressed air illness	16	62	59	5	20	3	2	1	168
14. Carbon dioxide poisoning	.....	.....	.....	.....	.....	1	1	1	3
15. Brass or zinc poisoning	7	5	2	10	2	12	8	3	49
16. Manganese dioxide poisoning (1)	.....	.....	.....	.....	.....	.....	.....	.....	.....
17. Radium poisoning (1)	.....	.....	.....	.....	.....	.....	.....	.....	.....
18. (a) Tenosynovitis hand) (1)	**	37	130	166	149	191	228	218	1,119
(b) Prepatellar bursitis (1)	**	13	23	29	23	19	27	25	159
19. Chrome ulceration (nasal and skin) (2)	6	10	20	16	79	20	43	49	243
20. Potassium cyanide poisoning (2)	3	2	.....	1	3	5	.....	1	15
21. Sulphur dioxide poisoning (2)	2	.....	.....	5	4	2	7	1	21
Total	1,127	1,317	1,259	1,217	1,069	1,129	1,415	1,294	9,826

* Specified as "Infection or inflammation of the skin on contact surfaces due to oils, cutting compounds or lubricants, dust, liquids, fumes, gases or vapors."

** Statistics not kept on Tenosynovitis and Bursitis in 1928. Both of these afflictions had been compensated as "accidental" injuries previous to July 1, 1929.

(1) Added to compensable list July 31, 1929, by Legislative Act, 89th General Assembly.

(2) Added to compensable list July 9, 1931, by Legislative Act, 90th General Assembly.

Summary of Compensable Occupational Diseases Reported 1928-1935, Inclusive.

melting, seven; caskets, six; printing and publishing, five; potteries, five; sanitary ware, chiefly the enameling process, 13. Of the lead cases, four were females—three engaged in decorating glassware and one a glazier in pottery ware. In the seven years (1928-1934, inclusive), 61 deaths were associated with lead poisoning (figures for 1935 not yet at hand).

There were also reported 49 cases of chrome ulcers—26 of the skin, 21 of the nasal septum (including three females), and two unspecified. Other compensable poisonings totaled 24—arsenic, three; benzol and derivatives, seven (one female); brass and zinc, three; petroleum and its derivatives, seven (including carbon tetrachloride, three, and the balance scattered. Tenosynovitis of the hand (wrist)

*In the diagnosis of silicosis and other pneumoconioses, this Department has followed the recommendations of the Committee on Pneumoconiosis of the American Public Health Association as rendered in 1932 and 1935.

The Association for the Advancement of Industrial Medicine and Surgery

Inc.

Executive Office - 370 Lexington Avenue, N. Y. (Room 904)

PURPOSE: *To disseminate accurate medical knowledge in reference to the diagnosis and treatment of all conditions arising out of and in the course of employment.*

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President's Address

Annual Meeting, 1935

By WILLIS W. LASHER, M.D., F.A.C.S.

IN ORDER that the Association for the Advancement of Industrial Medicine and Surgery may have a record of its inception, it might be well to relate that one morning in February, 1935, at the Labor Department, I met Dr. Halcyon Halsted, and it was suggested that those of us interested in industrial medicine and surgery should get together with an interchange of ideas.

Dr. Halsted agreed with me, and immediately we sought Dr. Irving Gray. The three of us then went to the office of John J. Blackford—with the result that the first Executive meeting of the Association was held on February 27, and among those present were Doctors Halsted, Gray, Sherman, Shapiro, Davis, Hamilton, and Avata. A tentative Constitution and By-Laws were drawn up, and in March these were approved of by about 50 of our original members. The name of the organization was suggested by Dr. Joseph H. Gaston, and on May 14, 1935, the "Association for the Advancement of Industrial Medicine and Surgery" was incorporated, in New York State.

Our first official meeting was held in the Grand Central Palace—thanks to New York Electrical Association. The paper of the evening was "A Discussion of Dust Diseases," read by no less an authority than Dr. A. J. Lanza, Assistant Medical Director of Metropolitan Life. This meeting was attended by approximately 150. From this point on, the annual reports of the various Committees will give an outline of the Association's activities.

Personally, most of my attention during the year has been devoted to bringing before others the objectives of our Association. To the best of my ability I have tried to bring about friendly relations between our Association and other professional and non-professional groups. To do this, it became quite evident that we should have something in the nature of an official publication. INDUSTRIAL MEDICINE: "The Journal of Occupational Diseases and Traumatic Surgery," from its appearance, its contents, and its national circulation, seemed to us most desirable. Drs. Burke C. Hamilton and David Shapiro were our appointees to the Editorial Staff. A few of our members have submitted articles for publication. It is strongly urged that more of our members avail themselves of this opportunity.

In analyzing our relationship to other organizations, it may be well to begin with organized medicine. We are not at odds in any way with the State or County Societies. At our recent banquet, the President of the State Society and the Presidents of the neighboring County Societies were all invited to attend. Whether or not those in control of these bodies will see fit to grant us consideration, I nevertheless venture to predict that because of our specialized knowledge and the character of our membership, we will eventually be called upon to take an active part in the industrial affairs of the state.

The possibility of our Association becoming a part of a special section of the Medical Society of the State of New York destined to develop an interest in industrial medicine, has been suggested. At least for the present, and until such time as this section has demonstrated its purpose, it does not seem to me that we should seriously consider losing our identity.

Unfortunately, the Association was begun when we were in the heat of considering the new compensation laws. I am told that in the minds of some there still lingers the thought that we are "soreheads" or "obstructionists." We have made every effort to contradict this impression by informing our professional colleagues that we are and shall continue to be a Scientific society. Naturally, in view of the fact that many of us have had years of actual experience in compensation work, it would be strange if we had not formulated any individuals opinions. However, the Association as a whole has not taken any united or concerted action regarding legislative matters. We have—and I believe I can speak for the entire membership—rather determined to observe with an unbiased mind the outcome of the recently enacted laws. It is my own feeling that, from now on, we should have more clearly defined and crystalized ideas relative to legislative matters. This would enable us, when called upon, to render more definite opinions. If we are not asked to cooperate in the drafting of future laws, then I personally believe that we should submit our own proposals and make every honest effort to see that the benefit of our extensive practical experience is brought before the proper authorities.

Regarding our relations with the American College of Surgeons, your president recently received a letter from Dr. M. H. Newquist who is most active in that section of the College dealing with industrial matters. We hope to arrange a conference in the near future with Dr. Newquist, and perhaps have him address the Association. We are proud of the fact that 33% of our members are Fellows of the American College of Surgeons. Although it may not be in my province to offer suggestions to the incoming official personnel, I feel any Directory containing the names of surgeons should also note the distinctive title of "F. A. C. S." The standards set forth by the American College of Surgeons are known to all, and certainly no one has obtained such a title without having done a considerable amount of surgery. Therefore, I suggest that the Association make an effort to persuade the Industrial Commissioner to include in his Directory the title which rightly belongs to the Fellows of the American College of Surgeons. Not in any official capacity, but purely in a personal manner, your President has already brought this to the attention of the Executive Committee of the College.

IDEAL FRACTURE TREATMENT for INDUSTRIAL SURGEONS

Bohler---TREATMENT OF FRACTURES

By DR. LORENZ BOHLER, Director of the Hospital for Accidents, Vienna; Lecturer on Surgery, University of Vienna. Translation from the fourth enlarged and revised German edition by Ernest W. Hey Groves, M.S., F.R.C.S., Emeritus Professor of Surgery, University of Bristol. Buckram binding, gold stamped, 6½x10¼, 588 pages, 1059 illustrations, $12.00.

LORENZ BOHLER has long been internationally famous for his many successful developments in methods for the treatment of all kinds of fractures. The German editions of his book are well known in America, but their use has naturally been restricted by the limitations of language. Even a fair reading knowledge of German is not sufficient for a complete grasp of principles or a reliable understanding of details of technique. Many American surgeons have wished for a complete and reliable English translation of Dr. Bohler's work, and one is now ready. Not only a complete translation of the fourth German edition, but added material, not previously published, from Dr. Bohler's latest experience with Fractures of the Spine and of the Neck of the Femur. Not a dull machine-like translation by an uncomprehending literary hack, but a work of appreciation done by a man who is himself a well known master-surgeon. Ernest Hey Groves, editor of the British Journal of Surgery, an authority on fractures, deliberately postponed revision of his own excellent book on the treatment of fractures in order to pay tribute to the Viennese master of the art, and make his work better available to all English-speaking surgeons. It has been well said that Dr. Bohler's book reveals he has that quality of genius which consists in the infinite capacity for taking pains. All of his painstakingly acquired knowledge and experience are now available to every American orthopedist and general surgeon.

Bohler's methods are not experiments but a carefully compiled and developed system, superior to that commonly in use, covering many years' experience with a large number of cases. Many American practitioners have visited his hospital where thirty to forty visiting surgeons from all countries watch his work daily. In fact the Bohler experience and methods have been for several years increasingly used in many American cities with success and satisfaction. In the words of a well-known California surgeon, "These methods, applied in the treatment of injuries, result in a lessened disability period, an earlier return to the proper industrial status of the patient, a shortened period of hospitalization, and the least possible impairment of function. The morale and physical well being of the injured are enhanced and economy to society ensues."

No surgeon should rest content until he has a copy of Bohler on his bookshelf for reference, for comparative purposes to aid him in improving his own methods and technique. The book is a liberal education in fracture treatment.

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"IT SHALL be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the department of public health or otherwise, to promote occupational health and safety education."—Sec. 11A of the law creating the Division, effective 1934.

The American College of Surgeons has published certain requirements relative to medical service in industrial plants, in order that these may obtain a rating from the College in the same manner that hospitals are now standardized. In New York several of our members, in their official capacity as Medical Directors, have obtained a "Grade A" rating for their Medical Departments. Temporarily (even in view of the recent legislation) such recognition may appear less important, but I venture to say that the work of rating industry, which the American College of Surgeons has undertaken, will progress throughout the country in spite of any changes occurring in various states. Therefore, I feel our Association should lend its cooperation in this national movement.

What has been said of the American College of Surgeons applies equally to the American College of Physicians. Their President, Dr. James Alexander Miller (owing to a Conference at Princeton) sent his regrets at not being able to attend our annual dinner. He expressed a most friendly attitude toward our Association. A number of our members are Fellows of the American College of Physicians, and I believe they should be entitled to their official designation, "F. A. C. P." in any Medical Directory the Industrial Commissioner may prepare. This is said because I feel that many employers and intelligent workmen will be better able to select their physicians if these titles are included. After all, it is the purpose of all of us to assist the employer and the injured man to obtain the best possible medical attention.

In regard to our relations with the New York State Society of Industrial Medicine, our Secretary, Mr. Blackford, made a tour up-state to acquaint those active in industrial medicine and surgery with our Association. He was very successful in meeting a number of outstanding men in Buffalo, Syracuse, Rochester, Albany and elsewhere. He conferred with the Secretary of the New York State Society relative to bringing about a consolidation. The matter was to be taken up at their Binghamton meeting, but so far as I know, no definite conclusions have been reached. I feel it important for them to favor the consolidation with this group in order that we may be in a position to send a united delegation from New York State to the national convention of Industrial Physicians and Surgeons. With the approval of the National Board, I believe we should assist in bringing about a systematic relationship between the various industrial societies which are now being formed in the various states.

Regarding our relations with the International Association of Industrial Physicians and Surgeons, this matter has been repeatedly taken up, and your President has had two conferences with Dr. Lewy and members of his staff. We, of course, would be only too glad to welcome into our Association members of this group, but no definite arrangements have been made. We have been honored by the presence of Dr. Lewy at our annual banquet and our various meetings. I am told that Dr. Lewy will again resume the Presidency of this organization.

As to non-medical societies: In order that our Association might become better known to those who have a common interest with us in industrial medicine, your President has conferred with the Insurance Buyers' Association. He has assured this organization of our desire to cooperate with them, and their Secretary has attended our meetings and they were represented at our annual banquet. Although they may criticize our inertia, I have every reason to believe that our relations to this group are most favorable.

Your President has attended the meetings of the New York Claims Association, and they know of our desire to cooperate with them. Their President was invited to, and attended, our annual dinner, and I have every reason to believe they will welcome

any services our Association may be able to render them.

The New York Association of Self Insurers are also familiar with the objects of our Society. We have discussed various matters with their Secretary who has recently written us relative to his desire to take up certain matters with our Association.

Several of our members are actively connected with the National Bureau of Casualty and Surety Underwriters. They are familiar with the purposes of our Association. It seems to me a great deal more could be accomplished if our members would make an effort to familiarize others with our aims and ambitions.

In order to demonstrate to the Federation of Labor our consideration for the welfare of the injured workers, we invited to our annual banquet leading representatives of organized labor. They were given every opportunity thoroughly to set forth their attitude toward any one of the problems of industrial medicine. Personally, I believe they were impressed with our conference and convinced of our desire to cooperate with them in bringing about a better relationship between labor, industry and medicine.

Aside from our contact with medical and non-medical groups, we have made a favorable impression upon the profession at large. We suggested to the membership that they notify their medical friends to attend our meetings in order that they may observe, first hand, the true nature of the Association. Your President has made it a point to extend a cordial invitation to all of his medical acquaintances.

We have not attempted to write anyone to join the Association. Rather we have taken the attitude that after they know what we are trying to do and what we stand for, they will voluntarily seek membership. Such an attitude has given us a solid membership rather than a large one. If we continue along these lines, I have no doubt the Association will grow.

Along the same lines, we suggested to the membership that they see to it that notices of our meetings are posted on the Bulletin Boards of the various hospitals with which they are connected. Practically all of our members have hospital connections. In the future our Scientific Committee expects to arrange its program far ahead of time, and there should be no reason why notices of our meetings should not appear among the programs of other medical associations.

There is another matter in which your President is deeply interested, and has been for many years, i.e. "medical education" with special reference to industrial conditions. May I suggest that this subject be given more consideration. The Associate Dean of the Post Graduate School of Columbia University attended our banquet. Sometime later, he suggested that among our membership were many men who no doubt would be extremely valuable in delivering lectures on highly specialized industrial subjects.

There is a group of physicians considering the founding of a Medical School with a special division and hospital department devoted solely to the teaching of industrial medicine and surgery. They propose offering a course of a year or more for the training of younger men who desire to enter what we consider to be a distinctly specialized field. Your President has had many conferences in this connection and has submitted outlines which, I understand, are now being considered by the Commissioner of Hospitals. Should this somewhat nebulous idea become a reality (which I predict sooner or later will occur) then may I suggest that our organization become a part of such a movement for the elevation of industrial medicine and surgery to its proper plane in the industrial world.

Finally, I wish to express my appreciation for the honor of being your first President, and to convey my personal gratitude to all of my friends, and my particular indebtedness to the untiring efforts of our Secretary. I look forward sincerely expecting that the incoming officers will do far greater things than any thus far accomplished.

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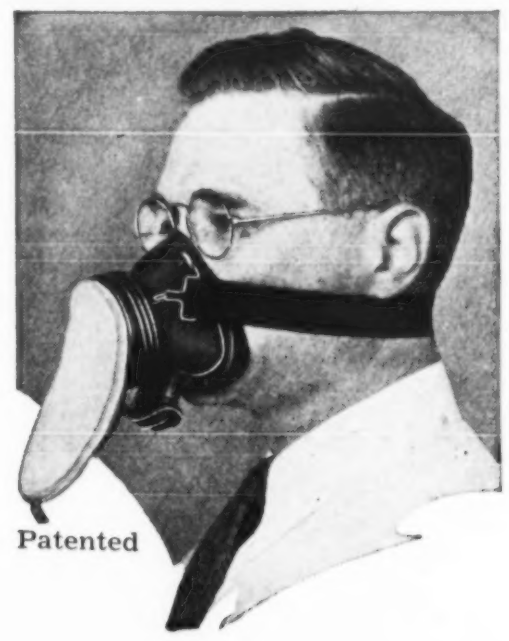
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Midwest Safety Conference

THE Fourteenth Annual Midwest Safety Conference, under the auspices of the Chicago Safety Council, the Illinois Industrial Commission, the Keep Chicago Safe Committee and cooperating agencies, will be held at the Stevens Hotel, Tuesday, Wednesday and Thursday, May 5, 6 and 7, 1936. There will be sessions on: Commercial Vehicles, Fire Prevention, Home Safety, Handling Materials, Safety in the Small Plant, First Aid, Public Safety, Training and Educational Methods, WPA, Occupational Diseases, and Safety Equipment.

Industrial Medicine
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The Journal of **Occupational Diseases** and Traumatic Surgery *for* Physicians and Surgeons in Industry

Its Field: **The Medical Science, the Law, the Economics, and the Statistics of**

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Of particular interest to industrial physicians and surgeons, as well as to engineers and safety directors, will be the Occupational Disease Session Thursday morning, May 7, at 9:30 a.m., in the North Ball Room on the 3rd Floor, and the Safety Equipment Session on Thursday afternoon, May 7, at 2 p.m., in the Grand Ball Room on the Mezzanine Floor of the Stevens Hotel.

Presiding at the Occupational Disease Session on Thursday morning will be C. S. Craigmile, Vice-President, Belden Manufacturing Co. On this program is a paper entitled "Eliminating Occupational Disease Hazards Through Ventilation," by M. I. Dorfan, Manager, Dust Collecting Division, Blaw-Knox Co., Pittsburgh, Pa., and a discussion of "What the Industrial Executive Should Know about Occupational Diseases," by Dr. R. R. Sayers, Director, Industrial Hygiene Department, U. S. Public Health Service, Washington, D. C.

In the Safety Equipment Session on Thursday afternoon, May 7, the presiding officer will be P. J. Brand, Director of Safety, Pullman-Standard Car Manufacturing Co., Chicago; and Dr. C. O. Sappington, Consulting Industrial Hygienist, Chicago, will discuss "Proper Type, Use and Maintenance of Respiratory Protective Devices." An innovation will occur in the next two subjects of this session: "Seventh Inning Stretch—A Musical Interlude," led by E. L. Wheeler; and "The Roving Broadcaster" will inquire about: safety shoes and foot protection; eye protection; protective clothing; respiratory devices; gas detection and ventilation; welding; ladders, and salt.

Of interest also to physicians, surgeons, and engineers will be the Safety Exhibit of the following companies: Aetna Casualty & Surety and affiiliated companies; American-LaFrance Foamite Industries, Inc.; American Optical Co.; American Red Cross; Black, Sivalls & Bryson, Inc.; Brown Shoe Co.; R. H. Buhrke Co.; E. D. Bullard Co.; Chicago Eye Shield Co.; Davis Emergency Equipment Co., Inc.; Duke Laboratories, Inc.; Holcomb Safety Garment Co.; Hynson, Wescott & Dunning, Inc.; International Shore Co.; Justrite Manufacturing Co.; Walter Kidde & Co.; Lehigh Safety Shoe Co., Inc.; Metropolitan Life Insurance Co.; Mine Safety Appliances Co.; National Safety Council; The Patent Scaffolding Co.; Peters Shoe Co.; Phister Manufacturing Co.; Protective Equipment, Inc.; Protectoseal Co.; Pyrene Manufacturing Co.; Safety Equipment Service Co.; Safety First Shoe Co.; Shepherd Safety Shoe Corp.; Standard Safety Equipment Co.; Travelers Insurance Co.; United States Department of Labor; Williams Jewelry & Manufacturing Co.

Occupational Diseases

THE law making obligatory the declaration of occupational diseases dates from 1919. But it applied only to certain of the most important ailments. A decree of October 15, 1935, increased the number of those diseases, and they are numerous. Here is the list:* every disease caused by lead, its alloys and combinations; mercury, arsenic, phosphorus, nickel, fluorine and allied substances; carbon sulfide; chromic acid and chromates; manganese dioxide and pyrolusite; zinc; halogenic derivatives of the carbohydrates of the greasy order (serie grasse); benzine and homologuous liquids, trinitrophenol, chloroform, and the like; irritant gas and vapors of any kind; cellulose paints and varnishes; alkali and caustic bases; tar, pitch, mineral oils; opium; emetine

* Paris Correspondent, *J.A.M.A.*: 106, No. 7 February 15, 1936, p. 550.

The Industrial Doctor

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and quinine alkaloids. To the list are added physical agents, such as short wave radiations, radium, and sudden variations of pressure; some irritant foreign timber, and biologic agents, such as bacteria and Ancylostoma. The enumeration covers also any product responsible for dermatoses; the powders, either siliceous or ferric, and the dust of wool; every repeated trauma causing inflammation of serious bursae or ligaments or of chronic arthritis; every repeated noise that might cause deafness, and every cause of conjunctivitis or even nystagmus.

The difference from the former law for the protection of workers against occupational hazards is that the law formerly related only to emergencies, the cause of which was sudden and unexpected, whereas the worker is now guaranteed against every risk that can be traced to his occupation. He is now entitled to receive half of his salary, and a pension if partial or total disability occurs; his family is indemnified in case of death, and he can be treated free by the doctor of his choice, who is paid by the employer. The only great risk of disease not covered by the law is tuberculosis, unless it is the consequence of some traumatism or former contamination. But in this case the worker is protected by the Assurances sociates, which pay during three years the expenses of sanatorium or special surgery and aid the family.

Apropos of tuberculosis, another recent decree includes the suppression of the 100% bonus to the pensioned for tuberculosis who would refuse to entrust their children to the care of special organizations. Too often, as a matter of fact, they kept with them their babies, disregarding the risks of contamination. On the other hand, the pensioned for tuberculosis are now bound to give evidence, every three months, that they have received regular treatment.

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